VOLUME LIII NUMBER ONE

THE NATIONAL GEOGRAPHIC MAGAZINE

JANUARY, 1928

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TO carry out the purposes for which it was founded forty years ago the National Geographic Society publishes this Magazine. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over $50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society is conducting extensive explorations and excavations in northwestern New Mexico, which was one of the most densely populated areas in North America *before* Columbus came, a region where prehistoric peoples lived in vast communal dwellings and whose customs, ceremonies, and name have been engulfed in an oblivion.

TO further the important study of solar radiation in relation to long-range weather forecastings, The Society has appropriated $60,000 to enable the Smithsonian Institution to establish a station for four years on Mt. Brukkaros, in Southwest Africa.

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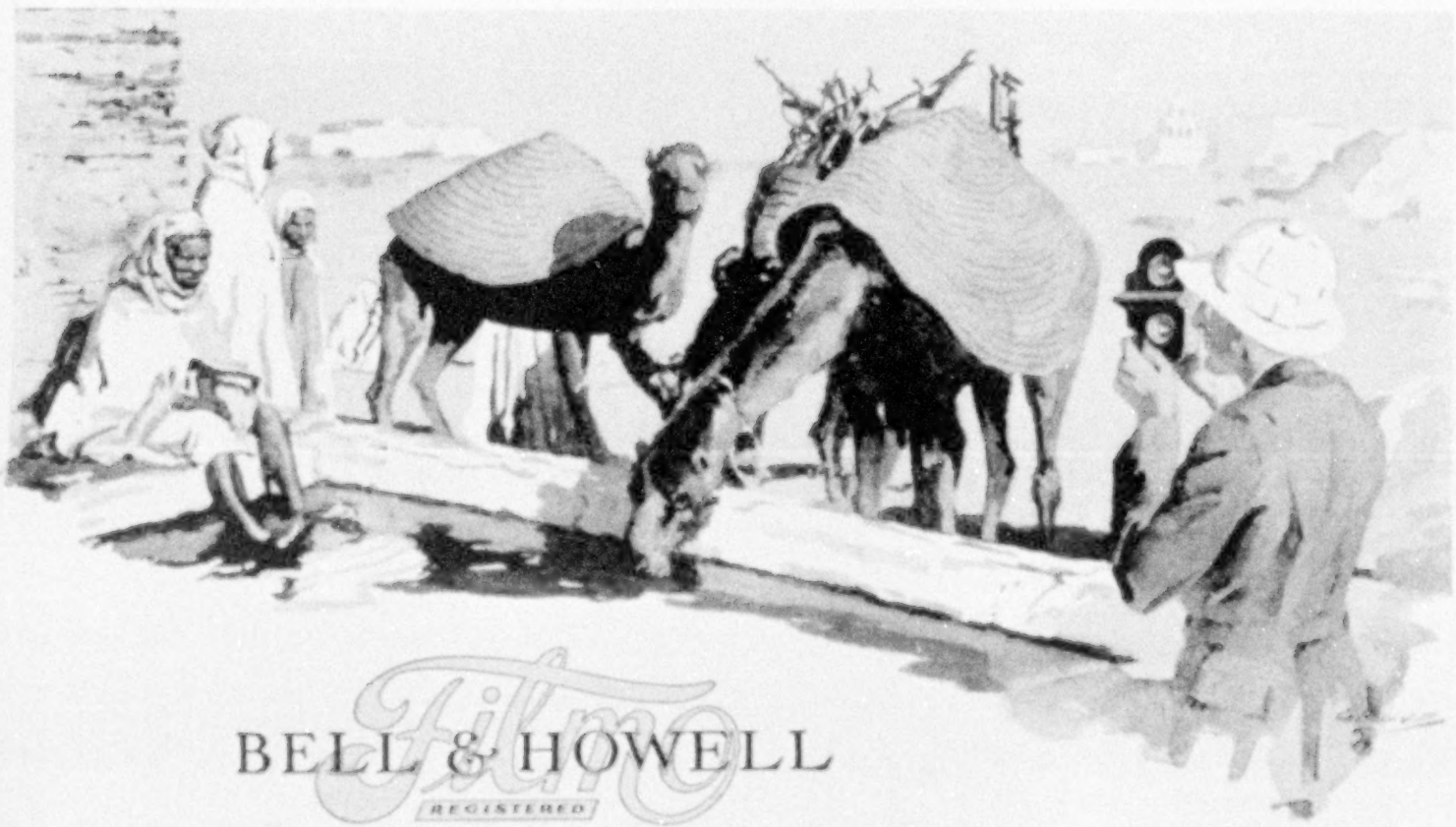

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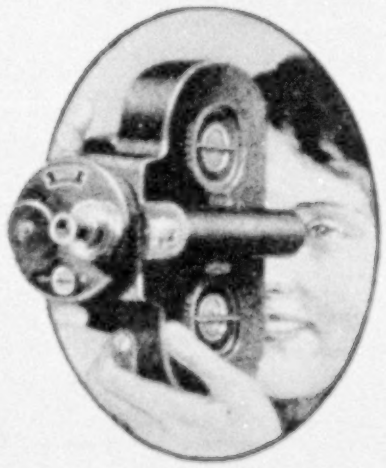

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LINCOLN MOTOR COMPANY
Division of Ford Motor Company

WHEN TONNEAUS BUTTONED UP THE BACK WAS THE WATCH YOU CARRY NEW?

A watch may never lose a second yet be many years slow

Cherish, as you should, that grand old watch of yours. Treasure it, and rightly, for the memories it recalls. But find a place, in your pocket or on your wrist, for a modern Elgin Watch . . . thin, light, slender, beautiful . . . For styles have changed in watches as in motor cars, and that old timepiece of yours belongs to other days.

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THE WATCH WORD FOR EFFICIENCY AND ELEGANCE

ELGIN

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WATCHES TRUE ALIKE TO THE TIME-MINUTE AND THE STYLE-MINUTE

Here are reproduced five outstanding Elgin models. Others may be had in generous variety, and at a price range most liberal.

(Prices slightly higher in Canada)

Refinement and beauty are linked with accuracy in this woman's wrist watch. The case is of 14-karat solid white gold, while the movement has 15 jewels $60

Only out of a long experience in fine watchmaking could come such a watch as this, good to look upon, faithful in service, a guaranteed 17-jewel movement, in a white gold-filled case . . . $40

Designed to withstand the punishment of sport wear is this man's strap watch . . . a 7-jewel movement in a handsome 14-karat gold-filled case of white tone, $40

That a strap watch can be handsome yet hardy is most eloquently proven by this Elgin. It has a 17-jewel movement, in a white gold-filled case $35

This watch is an excellent example of the value Elgin ever offers. The cushion case is made of 14-karat solid white gold. The movement is 17-jewel. The price . . $100

About 800 B. C. the Greeks sent messages by means of the Clepsydra. In two stations were water jars of equal size in which floated marked rods. On signal by torch or flag, plugs were pulled. When the rods lowered to a certain mark, at another signal both plugs were reinserted. The rods in both towers dropping to the same mark, the message was known.

Selectivity—Turn the dial of a Grebe Synchrophase Seven. Stations come in—clean, full-toned. No overlapping of programs—station separation is sharply defined. The tone of the Synchrophase Seven, especially when combined with the Grebe Natural Speaker, is unrivaled in naturalness. Its one-dial control assures simplicity of tuning that is remarkable.

Grebe construction, backed by eighteen years of making nothing but the highest grade radio apparatus, guarantees the durability of these superior qualities.

Grebe Synchrophase Seven, $135; Grebe Natural Speaker, $35. Send for Booklet N; then ask your dealer to demonstrate, in your home, that you can "get it *better* with a Grebe."

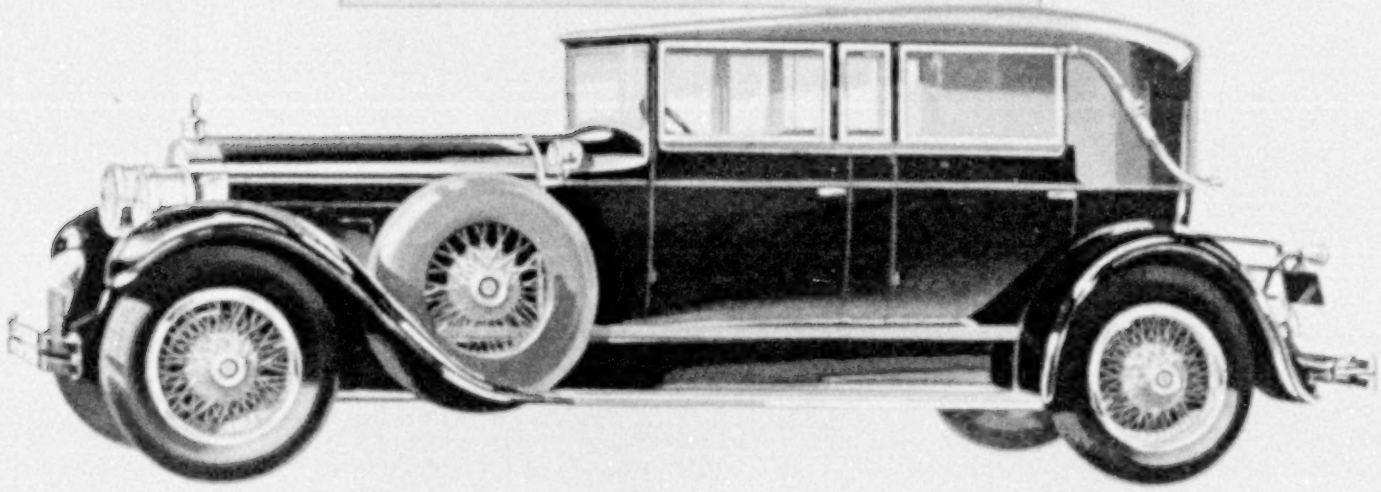
GREBE SYNCHROPHASE RADIO

A. H. Grebe & Company, Inc., 109 West 57th Street, New York City

Factory: Richmond Hill, N. Y. *Western Branch:* 443 S. San Pedro St., Los Angeles, Cal.

Makers of quality radio since 1909

Fine ladies had much leisure in the age of chivalry—their needlework was often a lasting artistic achievement



The Dietrich Convertible Sedan

CULTURED women instinctively recognize and appreciate fine work—whether it be the decorator's, the modiste's or the motor car designer's.

The preference such women have shown for Packard cars—not in a few large centers only but in every section of the Union—is a tribute to three particularly well recognized Packard qualities, beauty, prestige and long life.

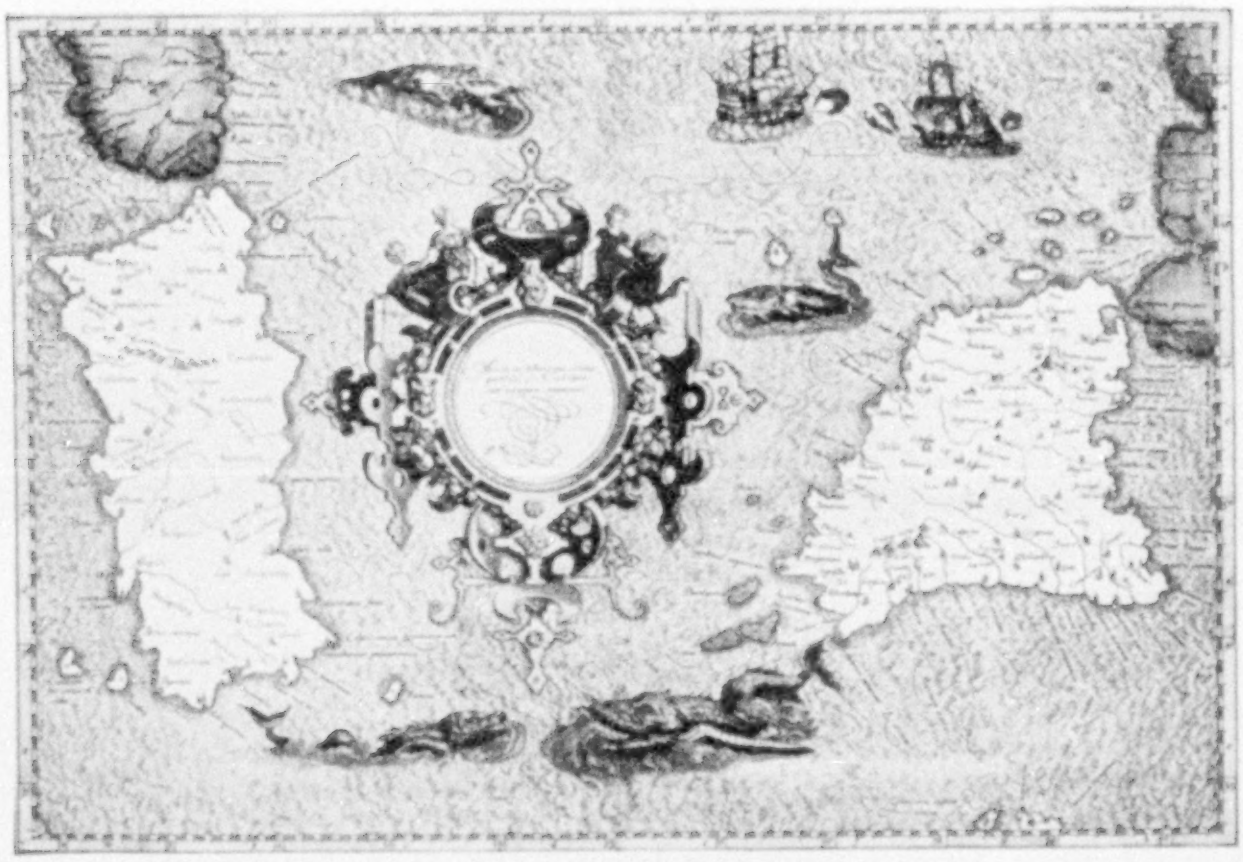
For women wish the family car and particularly their own private cars to reflect good taste and discrimination inside and out, to possess a distinguished reputation and, withal, to be of good quality and lasting service.

Woman recognizes a Packard—either Six or Eight—to be something more than a mere utility. She sees it also as a work of art. Here is necessary transportation made luxurious—and clothed with beauty.

The very needlework, and there is much of it hidden in the soft upholstery of a Packard interior, reflects the pride which Packard women take in aiding to produce the best built car in the world.

PACKARD

ASK THE MAN WHO OWNS ONE



Some terrors of the Deep

IT was a hostile world, with civilized man huddled in a small and not-too-safe corner!

Beyond, enormous monsters bared huge teeth, spat flames and slapped the waters with mountainous flukes.

Legends, neatly inscribed in Latin, told of fearful hurricanes and of malicious demons who lay in wait for unwary mariners.

And most men of the early sixteenth century, who saw these things on their maps, really believed in them. Columbus' crew, but a little before, had had to be recruited from unwilling sailors, who looked upon their conscription for the voyage as a sentence of death.

It was the unknown that terrified! And as the unknown dwindled, as sea after sea, continent after continent, was explored and charted, the earth took on a friendlier aspect.

No longer are maps so made as to strike fear into the timid reader's heart. Modern maps beckon us on, each one an invitation to voyage, in reality or in imagination.

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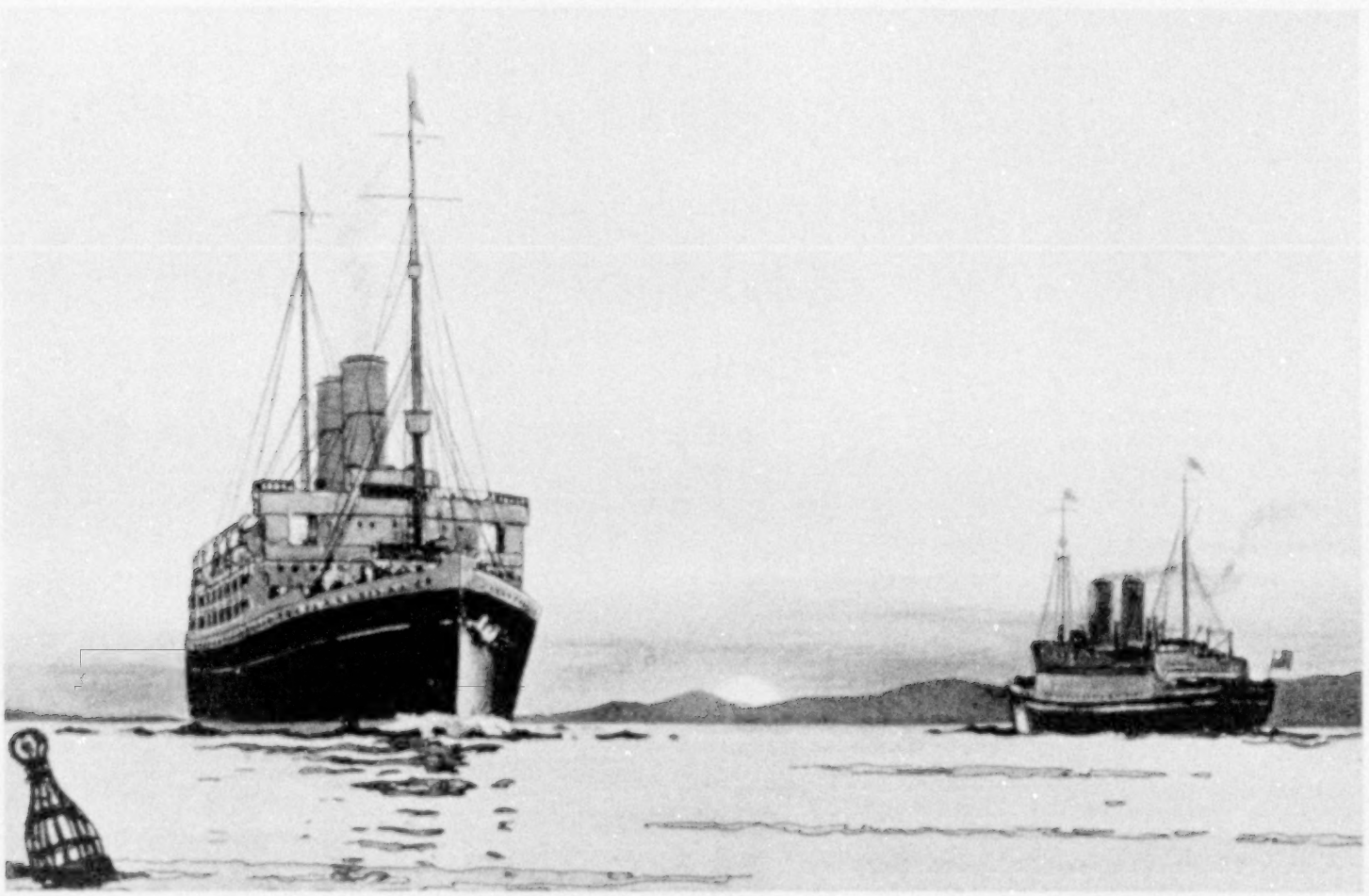

HAVE you talked with the Atlantic Ocean commuters, those for whom Europe is part of every year's program? More and more, you hear the suggestion: "Why not try the Canadian Pacific route?"

This is the route of the sunny St. Lawrence. Two fascinating days on a 5-mile-wide salt-river, widening into a 100-mile gulf—past century-old French-Canadian towns and jutting headlands. Then, in 3 swift days, across to the Scilly Isles. 6 days to Cherbourg, 6½ to Southampton.

This is the route of congenial people. Ship-board life has the easy, unstrained naturalness of a country club. Deck-sports have the friendly enthusiasm of a college meet. Service is instant and personal, not competed for.

This is the route of the Empress liners—of the Empress of Scotland, the Empress of France and the Empress of Australia—ships that stir pleasant memories in every traveled person's breast. They belong in the 20,000-25,000 gross-ton class. Big ships in size and appointments. Intimate ships in charm and in length of passenger list. The Empress of Australia is new as 1927. Princely suites. Roman bath. Rooms that astonish with their spaciousness and delight with their rates.

IN SERVICE—SPRING, 1928
Two new super-cabin liners
of 20,000 gross tons each
Duchess of Atholl
Duchess of Bedford
Two more in 1929

Try this different route, this fast route, this interesting route—in 1928. Write now for schedule of sailing dates.

Your own agent, or Canadian Pacific General Agents at Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Kansas City, Los Angeles, Minneapolis, New York, Philadelphia, Pittsburgh, Portland, San Francisco, St. Louis, Seattle, Tacoma, Washington. In Canada: Saint John, Montreal, North Bay, Toronto, Winnipeg, Nelson, Vancouver.

Canadian Pacific

World's Greatest Travel System

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It's really amazingly simple

You see that it hasn't a single drain-pipe, belt or fan . . . . and it never needs oiling

THIS simplified General Electric Refrigerator works automatically, economically. It needs no attention—not even oiling. Inside the hermetically sealed casing there is a permanent supply of oil.

The all-in-one icing unit is merely lowered into the top of the specially designed cabinet. There is no assembling, no plumbing to be done. There are no pipes, drains, fans or belts. The unit is intact. It just has to be plugged into any electric outlet. Instantly it starts. And quietly, economically, it gives you scientific refrigeration. Cuts down your marketing problems, your cooking tasks. It was for this the skilled engineers of General Electric worked—over a period of fifteen years—worked to produce the simplest of all refrigerators.

You will want to know more about this new-day refrigerator. There is a wide range of models and prices. Write us today for booklet N-1 which is interesting and fully descriptive.

GENERAL ELECTRIC Refrigerator

ELECTRIC REFRIGERATION DEPARTMENT • OF GENERAL ELECTRIC COMPANY HANNA BUILDING • CLEVELAND OHIO

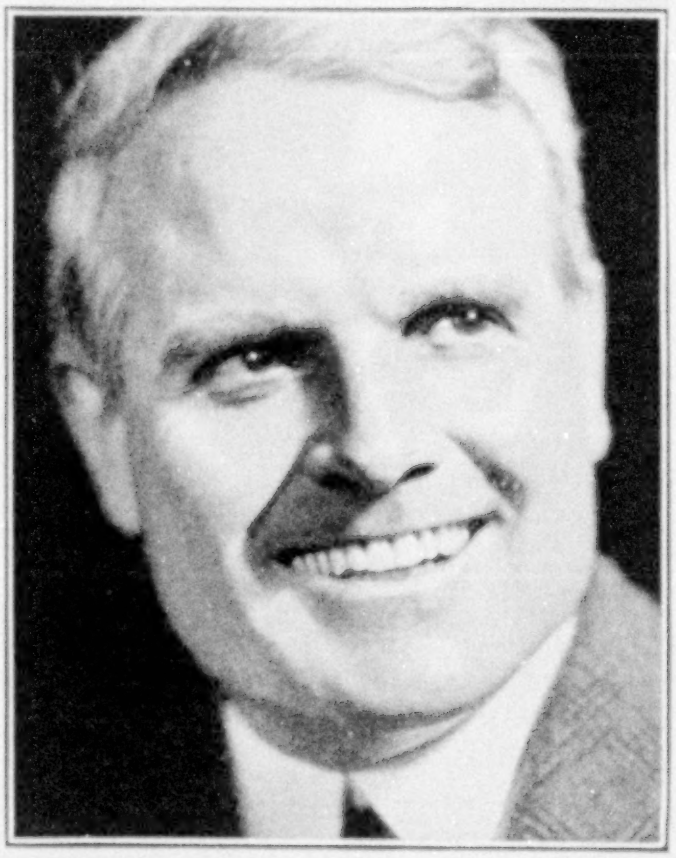
At 14 *and at* 40

In years to come will you have your teeth?

the same attractive SMILE

Glowing with *Healthy Lustrous* TEETH

How many can boast that their *teeth have stood the test of time?*



IN years to come, what kind of teeth will your smile disclose?

Gleaming teeth, sound teeth, unspoiled, attractive teeth?

If you are anxious to preserve the flash and charm of your smile, to keep it bright and wholesome as long as you live, take this one simple precaution:

Protect the health and soundness of your teeth by proven methods only.

In this country, and in foreign countries the world over, you will find thousands and thousands of men and women who began using Colgate's ten, fifteen, even twenty years ago, and whose teeth today are exceptionally sound and beautiful.

Many of these people are grateful enough to write to us. Some send their photographs also. Each day the postman brings a few more letters to add to an already bulging file. Many of these letters come from users who have brushed with Colgate's for at least a decade. We could fill the pages of this magazine with quotations from them—sincere, unsolicited reports from people proud of the soundness and attractiveness of their teeth.

There is nothing mysterious about these enviable results. The men and women fortunate enough to secure them did nothing that you cannot easily do yourself.

They visited their dentists for periodic inspections. And they used Colgate's Ribbon Dental Cream.

Choose your dentifrice on the basis of results. Follow the lead of those who have already kept their teeth sound for years. Simply adopt for your own use the dentifrice most popular among people with well-preserved teeth. You see, Colgate's stands apart from most dentifrices; it is expressly and scientifically made to get teeth clean.

Also, wouldn't it be an immense satisfaction to know that the dentifrice you were using was the one which dentists recommended most frequently?

So, for lovely teeth—for teeth that make your smile the social and business asset that it should be—ask your druggist today for Colgate's. Or, if you prefer, try the free sample offered in the coupon.

CLEAN

Years ago we set out to make the best dentifrice possible. Our chemists made countless experiments; we interviewed the leading dental authorities. They told us that the one thing a dentifrice should do is to clean the teeth. We then produced Ribbon Dental Cream — designing it to do that one thing superlatively well. It is not medicated, because the testimony of leading dental authorities today sustains the original principle that the one function of a dentifrice is to clean teeth.

Colgate & Co.
Est. 1806

Colgate & Co., Dept. 205-A, 595 Fifth Ave., New York **FREE**

Please send me a sample of Colgate's Ribbon Dental Cream, the cleansing dentifrice.

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Address_____

City_____ State_____

In Canada, Colgate & Co., Ltd., 72 St. Ambroise St., Montreal

NOW THAT MAN HAS WINGS

A GIANT all-metal plane drones overhead carrying the mail westward. . . . A man-driven machine leaps into the fresh sea winds of New York, to appear a few weeks later high over the jungles of Indo-China. . . . A winged car circles the lifeless ice-fields of the North Pole. . . . Flocks of planes dart upward through the clouds, and away from city to city, following lighted airways across the continent. . . . This is the world of today!

Now that man has wings he flies! No power in the world can hold him back!

At Le Bourget, in France, twenty-seven passenger planes leave daily on fixed schedules. At Tempelhof, in Germany, Lufthansa flights are guided by traffic police. The planes that fly from Croydon, in England, have an established record for dependability and safety that has brought insurance rates to Paris down to one-third less than by land and sea.

And yet America is already outstripping anything abroad!

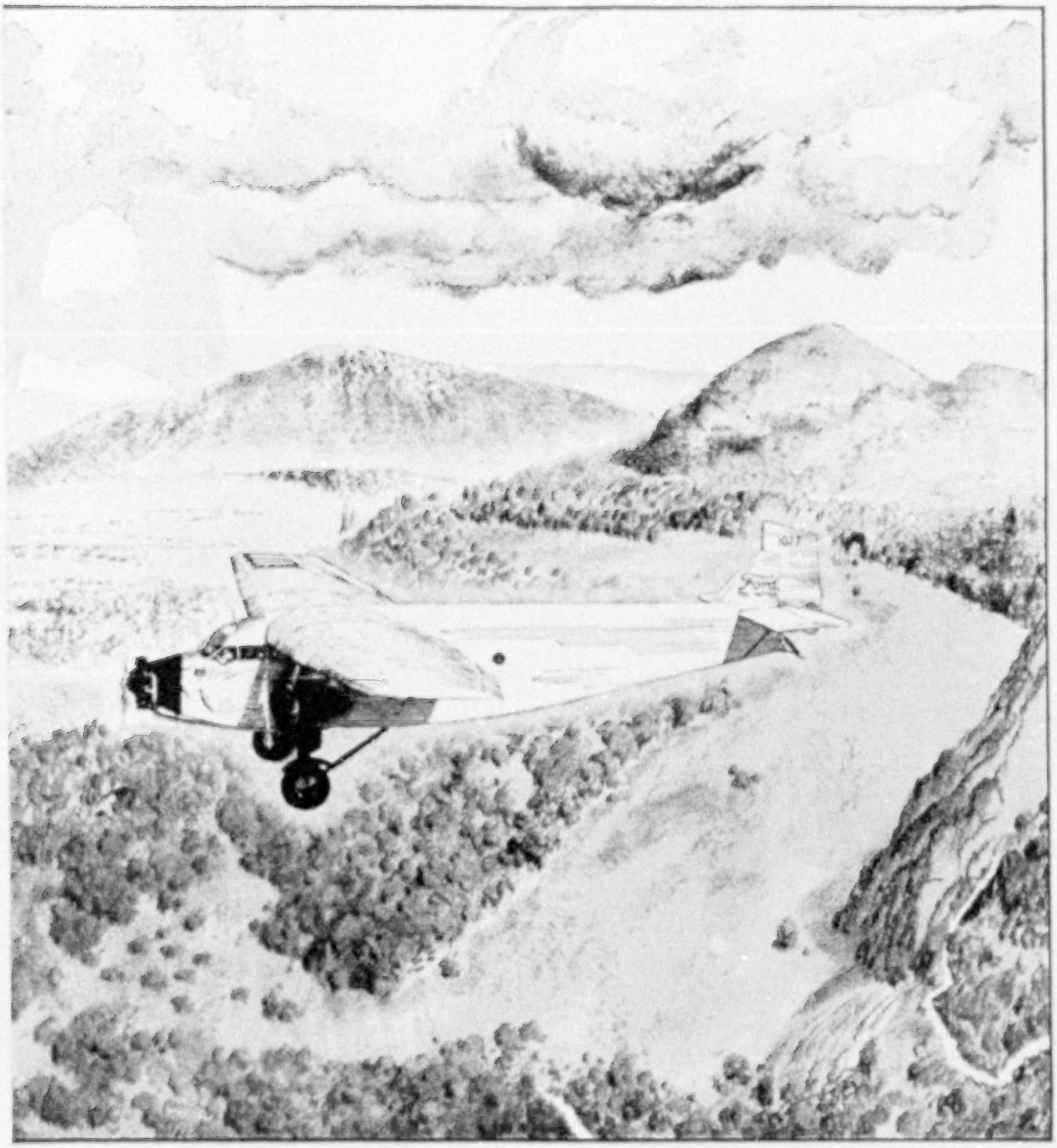
A steady stream of mail is carried along the established airways from the Atlantic to the Pacific, and from Detroit to Dallas, Texas. Ford planes, with an extraordinary record for reliability, have carried four and a half million pounds of express for merchants and manufacturers who know the value in competition of more speed and wider markets.

The planes of one American air-express company fly farther in a single day than all the combined flights of Lufthansa, and twice as far as the combined flights of the Imperial Airways. . . .

One hundred American factories are busily turning out new planes to meet the steadily increasing demand. . . . Close to a thousand air-ports are being rushed to completion to care for American planes flying in all directions.

And as fast as the U. S. Government defines new routes with lights and ports, air-traffic increases proportionately.

We are about to see a repetition of the history of the automobile on a broader scale. This does not mean we anticipate an airplane in every man's garage, or that the airplane will lessen the streams of automotive traffic that pour over the highways everywhere. *But*



it does mean that everyone will soon recognize the airplane as a means of extending the radius of human activity far beyond the scope of any vehicle that moves upon the surface of the earth.

Don't let sensational failures in the air blind you to the steady progress of non-sensational commercial flying. The prairie trails marked by the wrecks of Covered Wagons were soon enough obliterated by farm tractors and disk harrows! And the wrecks of wooden trains have not checked the swift smooth rush of all-steel limiteds, binding the nation together.

The Ford Motor Company has set the highest standards for its own accomplishments. Its rust-resisting, all-metal planes, tri-motored for unfailing dependability, are piloted by men whose preliminary training is based on 1000 hours of actual flight. Its great air-port at Dearborn, with modern passenger and express stations, is the center of stirring activity. *Every Lincoln automobile service station in the country is a potential service station for Ford planes.*

Now that man has wings he will open up new paths across the skies.

FORD MOTOR COMPANY

STEINWAY

THE INSTRUMENT OF THE IMMORTALS

TRISTAN AND ISOLDE, *painted by* HARVEY DUNN

Poignant, beautiful, and passionate, the music of "Tristan and Isolde" has unexampled power to stir the heart. For in this, perhaps the greatest of his operas, Wagner poured out the hunger, the hopeless and ardent longing of his unhappy love. Both from the standpoint of technique and emotional intensity it is an epic work.

WHEN the fingers of Richard Wagner first touched the keys of a Steinway in 1879, its reputation as the world's foremost piano was already definitely established. That reputation has grown and expanded with the years. Today the Steinway is the universally accepted instrument, not only upon the concert stage, but in thousands of cultivated homes.

There are still Steinways in active service which sounded to the touch of childish fingers, rang beneath the impact of maturer hands, and continued to make their rich and sure return even to the second and third generation. . . . Such an instrument is more than an exquisite mechanism. It enters upon a personal, intimate relationship. It becomes a companion, a mentor, and a friend.

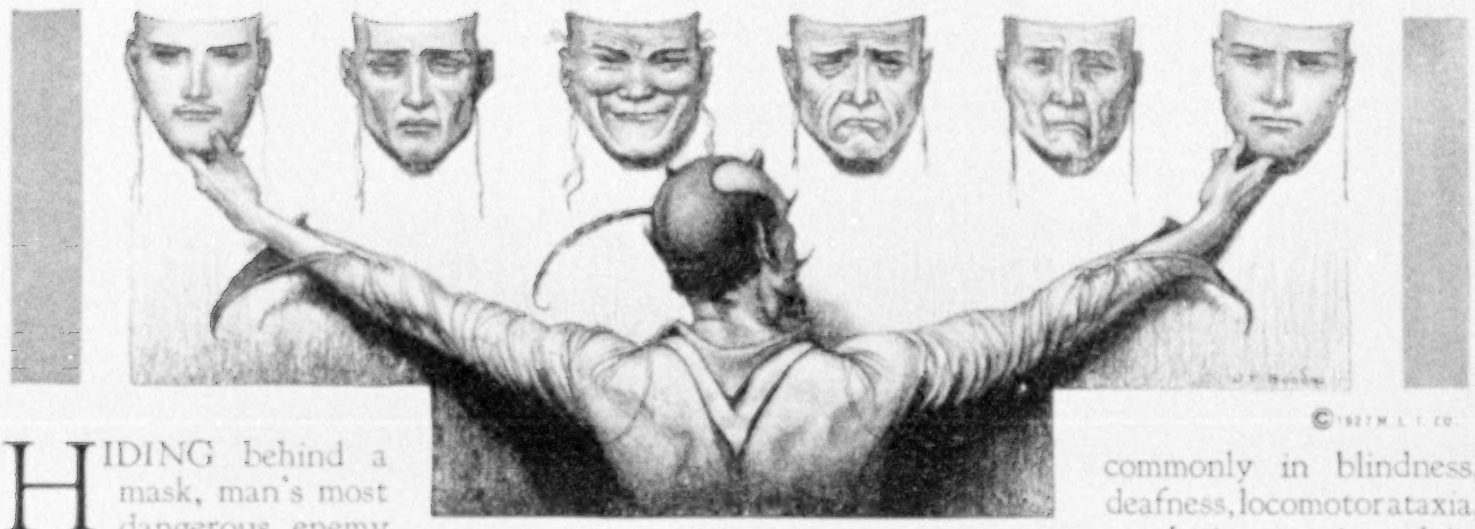
Viewed in the light of its amazing durability, the Steinway is actually among *the least expensive of pianos.* For 30, 40, and even 50 years or more it will serve you well, helping to shape the musical traditions of your family, yielding that joy of ownership arising from the best. And no matter which of the many styles and sizes you select, each will give the same lifelong satisfaction. . . . For the Steinway is a permanent musical investment. You need never buy another piano.

There is a Steinway dealer in your community, or near you, through whom you may purchase a new Steinway piano with a small cash deposit, and the balance will be extended over a period of two years. Used pianos accepted in partial exchange.

Prices: $875 *and up*

Plus transportation

Steinway & Sons, Steinway Hall
109 West 57th Street, New York



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The Great Imitator

HIDING behind a mask, man's most dangerous enemy strikes in the dark and adds two out of every thirteen deaths to his score. Just so long as men and women, and boys and girls approaching maturity, are not taught to recognize the cruelest of all foes to health and happiness—just so long will many lives be wrecked, lives which could have been saved or made decently livable.

Strange as it may seem, tens of thousands of victims of this insidious disease (syphilis) are utterly unaware of the fact that they have it.

No other disease takes so many forms. As it progresses, it may mask as rheumatism, arthritis, physical exhaustion and nervous breakdown. It may appear to be a form of eye, heart, lung, throat or kidney trouble. There is practically no organic disease which it does not simulate.

Syphilis is responsible for more misery of body and mind than any other disease. It destroys flesh and bone. Its ulcers leave terrible scars. It attacks heart, blood vessels, abdominal organs—and most tragic of all are its attacks upon brain and spinal cord, the great nerve centers, resulting commonly in blindness, deafness, locomotor ataxia, paralysis, paresis and insanity—a life-long tragedy.

Countless millions of victims have been wickedly imposed upon and hoodwinked by quacks, charlatans and worse—insidious blackmailers pretending to practice medicine.

The United States Government took a brave step forward during the Great War and told our soldiers and sailors the truth about this dread disease.

It can be cured by competent physicians if detected in time and if the patient faithfully follows the scientific treatment prescribed by his doctor. After the disease has progressed beyond the first stages, cures are less certain, but a great deal can often be done to help chronic sufferers.

Men and women should learn the truth and tell it to those dependent upon them. It is a helpful sign that the best educators deplore the old habit of secrecy and urge wide-spread knowledge and frank instruction.

It is estimated that more than 12,000,000 persons in the United States have or at some time have had syphilis.

From 5% to 40% of all the cases in the general hospitals of this country are found to be suffering—directly or indirectly—from this disease. The variance in the figures depends upon the character and location of the hospital.

According to Government statistics, the deaths of 200,000 Americans, each year, are directly caused by syphilis and associated diseases. But thousands of deaths charged to other causes are actually due to this disease.

Hospital and clinic records show that early infant mortality can be reduced one-half by prenatal treatment of syphilitic infection.

The Metropolitan Life Insurance Company will gladly mail, free of charge, its booklet, "The Great Imitator". You are urged to send for it.

HALEY FISKE, *President.*

Published by

METROPOLITAN LIFE INSURANCE COMPANY—NEW YORK

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SEEING AMERICA WITH LINDBERGH

The Record of a Tour of More Than 20,000 Miles by Airplane Through Forty-eight States on Schedule Time

BY LIEUTENANT DONALD E. KEYHOE, U. S. M. C. (RETIRED)

DEPARTMENT OF COMMERCE AIDE TO COL. CHARLES A. LINDBERGH

With Illustrations from Photographs by the Author

"WE'LL cover about twenty-two thousand miles," said Colonel Lindbergh, as he straightened up from the United States map on which he had drawn an endless zigzag line. "That includes 82 stops and flying over cities where we can't land. We can make it in about three months."

Milburn Kusterer, advance representative for the tour, glanced at the map and shook his head dismally.

"And I have to go all that way by train," he groaned. "I'll bet I'll never see a hotel bed once on the whole trip."

"You'll certainly have to move," replied Lindbergh with mock sympathy. "You ought to be traveling by air."

It was July 11, and only eight days remained before the start of the United States Tour for stimulating interest in commercial aviation. We had just completed the final plans and had had them approved by Mr. Harry F. Guggenheim, president of the Daniel Guggenheim Fund for the Promotion of Aëronautics, which was sponsoring the tour. We had decided on 68 overnight stops, at least one in each State. Shorter stays, which were designated as "touch stops," were included at 13 other places (see text, page 8).

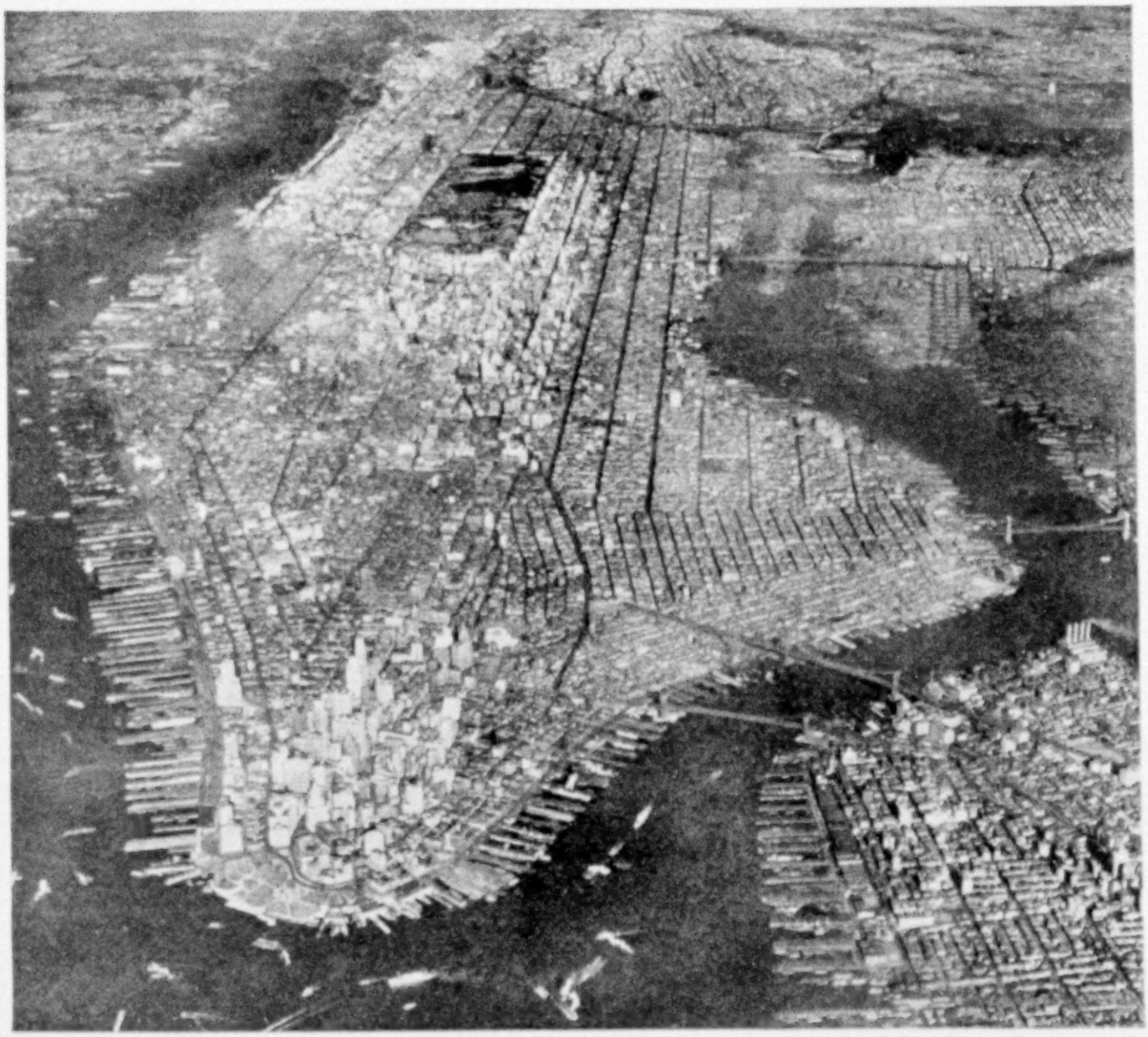
The arrival hour was to be exactly 2 o'clock at each city, for Colonel Lindbergh insisted that the most important consideration was to be on time. A standard program was outlined, regardless of the size of the place visited. Kusterer was to travel ahead of us and meet the reception committees, so that he could fit in this program with their plans.

Colonel Lindbergh was to use the *Spirit of St. Louis*, as it would be of much greater interest to the people because of its famous flight across the Atlantic. Making this long journey with the same ship and engine that performed this great feat would emphasize the safety and durability of modern aircraft.

TWO PLANES READY FOR THE LONG TOUR

The Department of Commerce, through Assistant Secretary William P. MacCracken, Jr., of the Aëronautics Branch, had agreed to send along a plane that would precede the *Spirit of St. Louis* by a few minutes at each city. This ship was to be piloted by Philip R. Love, Aëronautics Inspector, and was to carry a mechanic and me.

Love had flown with Colonel Lindbergh during their Army training days and also



Photograph by Airmap Corporation

THREE HUNDRED SQUARE MILES OF NEW YORK CITY AND ENVIRONS SEEN FROM AN ELEVATION OF 12,000 FEET

A wonderful panoramic view of Greater New York, showing Manhattan Island, between the Hudson (left) and East River (right), with bridges (Brooklyn, Manhattan, Williamsburg, and Queensborough) to Brooklyn. To the right and near the top of the picture is Hell Gate Bridge (see, also, page 3). Beyond it, to the right, is Long Island Sound. The photograph shows the concentration of skyscrapers in three well-defined localities—the downtown, or financial, district at the south (lower end of Manhattan), the Fifth Avenue shopping district (center, south of Central Park, the oblong space in the background), and the Riverside Drive residential district, on the bank of the Hudson, in the northwest.

with him on the mail route between St. Louis and Chicago. My flight training had been in the Marine Corps, and I had been fortunate enough to be connected with the Byrd Polar Plane Tour sponsored by the Guggenheim Fund in 1926. The mechanic selected by the Wright Aëronautical Corporation was Theodore R. Sorenson.

By July 20th everything was ready. Kusterer had been given his week's start and another warning to travel fast. Each of the 82 cities had been notified of the date on which we would arrive. It was up to us to reach them on time and to return to New York on October 23, as scheduled. Both ships had been inspected and pronounced ready for their long aërial voyage across the continent.

THE "SPIRIT OF ST. LOUIS" WAS STILL "BLIND"

At 12 o'clock Love, Sorenson, and I took off from Mitchel Field for Hartford, and the United States Tour was under way. Colonel Lindbergh followed soon after.

Photograph by Airmap Corporation

UNFAMILIAR NEW YORK FROM THE AIR

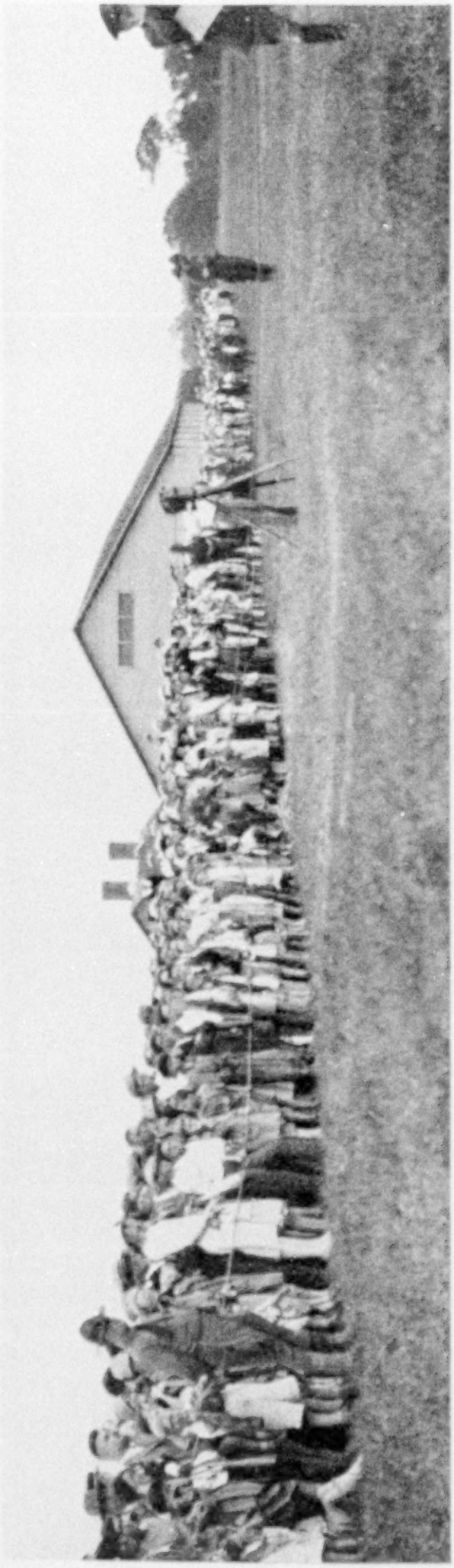
In the upper right corner is Manhattan Island, divided from Long Island (left) by the East River. In the foreground is the Bronx, from which the railroad tracks cross Randalls Island; then Wards Island and the famous Hell Gate Bridge to Long Island, from which they reach the Pennsylvania Station by recrossing the East River, this time by tube. The Hudson River and the Jersey shore are seen dimly through the haze at the top of the picture.

This first day was a good example of the standard program. We arrived at 1:45, which gave us 15 minutes to meet the reception committee and check the final arrangements. The most important detail was to have the field cleared. The *Spirit of St. Louis* was still "blind" because of the main gas tank up forward. Taxiing near the crowd would have been dangerous, as Colonel Lindbergh could not have seen any one directly ahead of him, and the whirling propeller could easily have caused a serious accident. For this reason we had to insist that the field be cleared and the hangar space vacant until his engine was shut off.

There was no difficulty at Hartford. The field was well policed and the *Spirit of St. Louis* landed without difficulty. After the open-air meeting, at which Colonel Lindbergh spoke on commercial aviation, he was driven slowly through the crowded streets, while thousands of people from Hartford and the surrounding country showed their regard for the man who had made the first lone "hop" across the Atlantic. The afternoon ceremonies were closed by a press interview.

CITIES VISITED ASKED TO MARK THEIR ROOFS

The time between this and the banquet was supposed to be our rest period; but we had neglected one important matter: the arrangement of the schedule pushed our lunch hour forward to 5 o'clock in the



WAITING FOR THE "SPIRIT OF ST. LOUIS" AT PROVIDENCE, RHODE ISLAND

afternoon, and the rest of this time was taken up in attending to tour business and getting ready for dinner. The banquet began at 7 and ended at 9 o'clock.

The rest of the evening was devoted to planning the next day's flight. This had to be figured very carefully, as there were always requests from cities asking Colonel Lindbergh to circle over them. If they were near the course, he agreed on condition that they mark their roofs to guide aviators on cross-country flights. Such air-markings are helpful to pilots who are not familiar with the country. Without them, a pilot who is lost frequently has to dive down at a railroad station to read the name on the side. This is dangerous and should be entirely unnecessary.

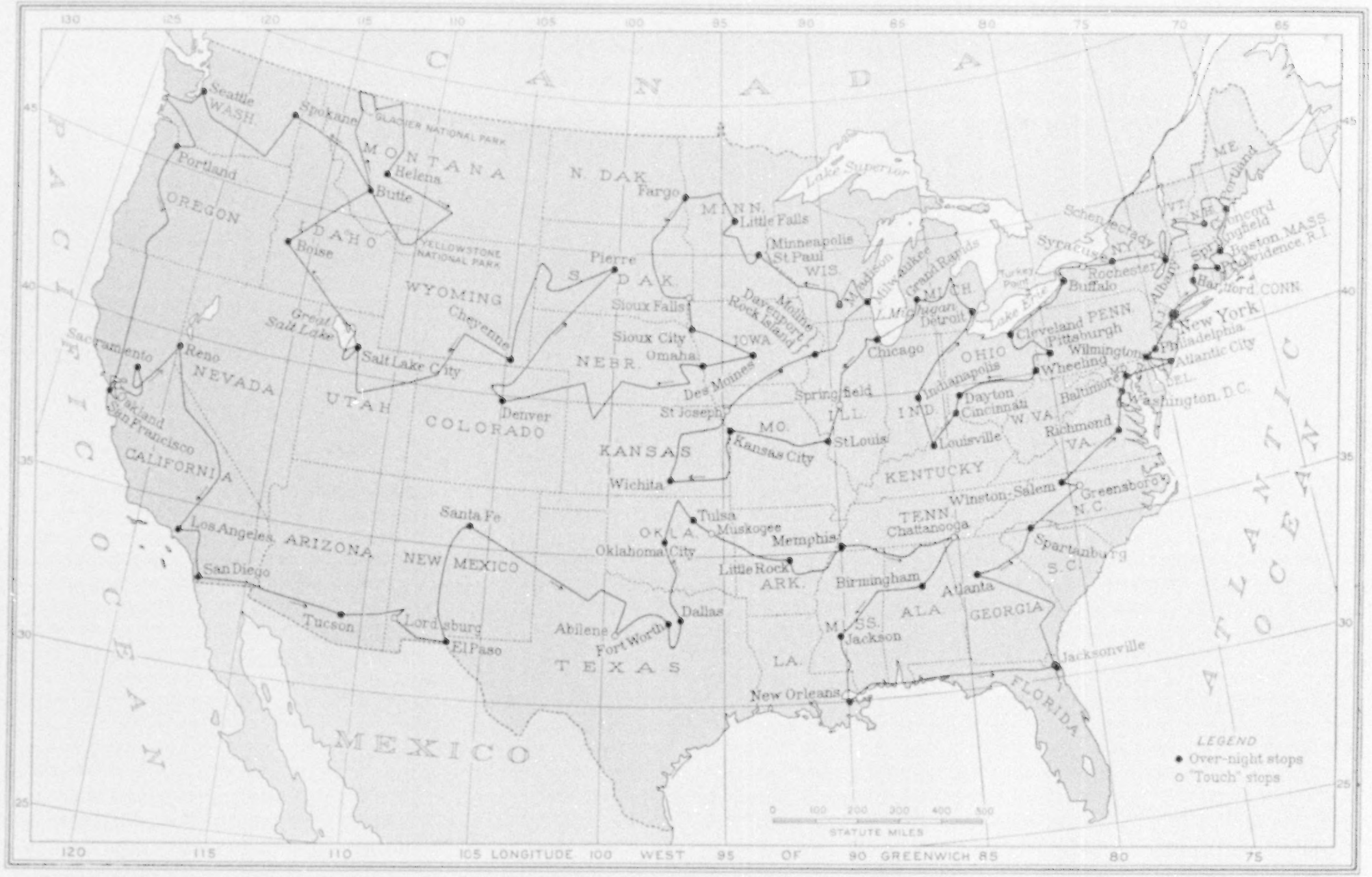
When the day's route had been decided, the total distance was measured, and from this we figured the flying time. Half an hour was added to allow the advance plane time to arrive ahead of the *Spirit of St. Louis*. Two hours covered the time for dressing, breakfast, packing, driving to the airport, and warming up the engines. Subtracting this total from 2 o'clock gave the hour of arising, which was sometimes undesirably early.

On the second day we flew to Providence, landing at Quonset Point. The program here was carried out as at Hartford, and the next morning found us headed for Boston. Colonel Lindbergh received a great ovation at this historic city. The next morning we attended a breakfast in honor of Commander Byrd and the crew of the *America*, and Lieut. Lester J. Maitland and Lieut. Albert F. Hegenberger, of San Francisco-to-Honolulu fame.

TAKING OFF FROM BOSTON IN DENSE FOG

When we reached the airport we experienced our first trouble. A dense fog covered the bay and the surrounding territory. When Colonel Lindbergh started his engine, there were protests at his flying when visibility was so poor. He went ahead with his preparations, however.

"Flying in this fog won't be so bad," he explained. "With these modern instruments, it is easy to fly indefinitely without seeing the ground or sky. All I am worried about is whether the airport at Portland is clear."



Drawn by A. H. Bumstead

THE ROUTE FOLLOWED BY THE "SPIRIT OF ST. LOUIS" AND ITS COMPANION PLANE

A new record for reliability and punctuality was established on this remarkable tour of more than 20,000 miles, over a period of three months, with stops at 82 cities and an overnight stay in each of the 48 States of the Union. Only once did the planes fail to keep their schedule, which called for a landing at 2 o'clock every afternoon in 68 places.

Official Photograph, U. S. Army Air Corps

THE ENVIRONS OF ALBANY, NEW YORK

This picture shows with great distinctness the irregular checkerboard effect of farms on which different crops have been planted. The experienced cross-country pilot is able to tell by a glance beneath him just what kind of a landing field any one of these spots would make. A field of standing corn presents a different appearance from one in which new wheat is growing. A plowed field is entirely distinct from one covered with sod. All of these things are quickly learned. The Hudson River is seen at the right.

Love nodded in confirmation of this.

"He's flown the mail on worse days than this," the latter said to me. "He knows what he is doing."

Colonel Lindbergh took off first, in order to fly over Lynn and Worcester on the way to Portland. Love wished to follow immediately, but he was doubtful about carrying anyone with him. Mail pilots are accustomed to flying alone in fog. In addition, his bank-and-turn indicator had not been working well. Finally, he decided to test this in a flight around the airport.

He had hardly taken off when the fog descended completely to the ground, so that he could not see to land. We heard him circling overhead for 20 minutes and then the sound of his engine died away. Sorenson and I, thinking he had gone to Portland, secured a State trooper and an automobile and headed for Maine at high speed.

Reaching Portland, we were glad to find that Love had landed safely in a small field near Biddeford. He had returned to Boston shortly after we had left and had taken off again. The fog had been so bad that he had flown clear across New Hampshire without once seeing the State.

Colonel Lindbergh had circled above Portland for more than three hours, trying to see through the dense fog, which covered almost all of the countryside. Knowing that the *Spirit of St. Louis* would not be safe at any place but the airport, he did not make an emergency landing, such as Love had done, but headed southwest and landed at Concord, New Hampshire, where he remained overnight, flying to Portland on Sunday. This was to have been a rest day, so we were back on schedule the next day, when we started for the official visit to Concord.

MOST OF THE NATION'S FAMOUS SCENIC SPOTS SEEN FROM THE AIR

We had decided to fly over all the noted scenic spots of the country when such excursions would not delay the tour; so this morning we headed the ships north, into the White Mountains, at first flying together in close formation. Then we spread out and began to explore different parts of the range.

We remained in sight of each other until after circling Lake Winnepesaukee and Poland Springs. Here we separated, our advance plane going straight to Concord, while Colonel Lindbergh flew over one or two cities to drop messages, which were inclosed in canvas bags, with orange streamers to attract attention. The messages were as follows:

ABOARD "SPIRIT OF ST. LOUIS" ON TOUR

GREETINGS:

Because of the limited time and the extensive itinerary of the Tour of the United States now in progress to encourage popular interest in aëronautics, it is impossible for the *Spirit of St. Louis* to land in your city.

This message from the air, however, is sent you to express our sincere appreciation of your interest in the Tour and in the promotion and extension of commercial aëronautics in the United States.

We feel that we will be amply repaid for all our efforts if each and every citizen in the United States cherishes an interest in flying and gives his earnest support to the Air Mail Service and the establishment of airports and similar facilities. The concerted efforts of the citizens of the United States in this direction will result in America's taking its rightful place, within a very short time, as the world leader in commercial flying.

(Signed) CHARLES A. LINDBERGH.

HARRY F. GUGGENHEIM, *President*,
Daniel Guggenheim Fund for the
Promotion of Aëronautics.

WILLIAM P. MACCRACKEN, JR.,
Assistant Secretary for Aëronautics,
Department of Commerce.

From the start, the program had grown easier, as we became more used to it. At Concord and at most of the cities that followed, the ceremonies were about the same as at Hartford.

Between Concord and Springfield we explored the Green Mountains. Once or twice we surprised the inhabitants of some remote village, as we shot down over them. On the way to Albany we twisted around in the Catskills until heavy rainstorms sent us back on our course to the Hudson.

Lake George was the magnet that drew us the next day. We were scheduled for a touch stop at Schenectady, but we left Albany rather early and flew around this city on the way to Lake George. The short distance between Albany and Schenectady

A MOMENT OF RELAXATION IN CANADA

The punt in which Colonel Lindbergh and Philip Love are shown had just been shoved to one side by the occupants in the punt ahead of them. In the battle which followed, everyone in the party was in imminent danger of being ducked, but all escaped with minor injuries.

caused the people to expect us there within a few minutes, although we were not due until later. When we did not arrive it was reported that we had had an accident. This happened several times afterward in similar cases, for we did not announce our "sight-seeing" plans.

The Schenectady visit illustrates a touch stop. We did not leave the airport because of the short time at our disposal. Colonel Lindbergh gave a talk on aviation and made an opportunity for the crowd to see the *Spirit of St. Louis*.

From Schenectady to Syracuse was a fairly short flight. The next day we headed for Rochester, which was another touch stop. We had some extra time in going to Buffalo, so we flew over Niagara Falls. The wires near the brink kept us from getting a very close glimpse of the Falls, but we had a fairly good view of the famous cataract, from both the American and Canadian sides (see illustration, page 10).

Low clouds and a misty rain made visibility poor as we neared Buffalo and we had to detour around the city to be sure of not striking any buildings. There was no trouble in landing after we found the airport, which is one of the best in the United States.

Our first holiday began on the second day at Buffalo. We drove across the International Bridge into Canada, heading up toward Turkey Point, on Lake Erie (see illustrations above and on pages 9 and 11). Here we spent Saturday and Sunday fishing and swimming.

Although there were scores of other fishermen within a short distance of us, some of them less than 100 feet away, no one recognized Colonel Lindbergh as he leaned against a thwart and lazily dangled a line over the side of our boat.

Sunday night we returned to Buffalo, feeling quite refreshed and ready to go on with the tour. Kusterer, who had doubled back to compare notes with us, missed his

A CHANGE FROM THE ROUTINE OF BANQUETS

The aviators of the nation-encircling flight spent the week-end of July 30 near Turkey Point, Canada, on Lake Erie. This was one of the few times during the tour when Colonel Lindbergh was securely hidden from the thousands of enthusiastic admirers who always clamored to see him.

train on Sunday night and flew to Cleveland on Monday as a passenger in the advance plane.

THE ADVANCE MAN GETS A RIDE AND A THRILL

Because of a slight delay in getting started, Love decided to fly straight down the shore of Lake Erie at a low altitude, so that he would not meet the head winds higher up. Two or three times, when we were rather close to the water, he purposely changed the altitude adjustment in the carburetor so that it created a lean mixture, making the engine sputter erratically.

Sorenson and I would pretend to get ready for a forced landing in the lake, advising Kusterer to get a life preserver and be prepared to jump just as we struck. When we arrived in Cleveland he swore he would never get in another ship with any member of the tour.

The police had difficulty in controlling the crowd at the Cleveland airport, but the ships were finally put under cover. After the official program, Colonel Lindbergh renewed his friendship with Ambassador Herrick and his family.

Next came Pittsburgh, with its scores of steel mills and foundries. From here we went to Wheeling, landing at Moundsville after a pleasant flight down the Ohio River.

The following day we flew across the more level State of Ohio to Dayton, the home of the Wright Brothers. After this we visited Cincinnati, flying once again across the Ohio River and circling the

Photograph by Airmap Corporation

THE "RIGHT TURN" OF THE NIAGARA RIVER AT THE FAMOUS FALLS

The American Fall, near the International Bridge, and the Canadian (Horseshoe) Fall, near the top of the picture, photographed from the air at an elevation of 2,000 feet. Goat Island divides the Falls into two parts.

Kentucky hills before landing. For some reason, this particular spot seemed to have an unusual attraction for Love, who left most regretfully on Monday morning when it was time to go on to Louisville.

Here we circled Churchill Downs, home of the famous Kentucky Derby. On the next flight we passed over a race track of a different kind, the automobile speedway of Indianapolis, where some of the most thrilling races in the world have been run. This speedway was familiar to me, as Floyd Bennett had landed the *Josephine Ford* in the center of it the year before. Now Indianapolis has a new airport, fully equipped and ready for extensive operations.

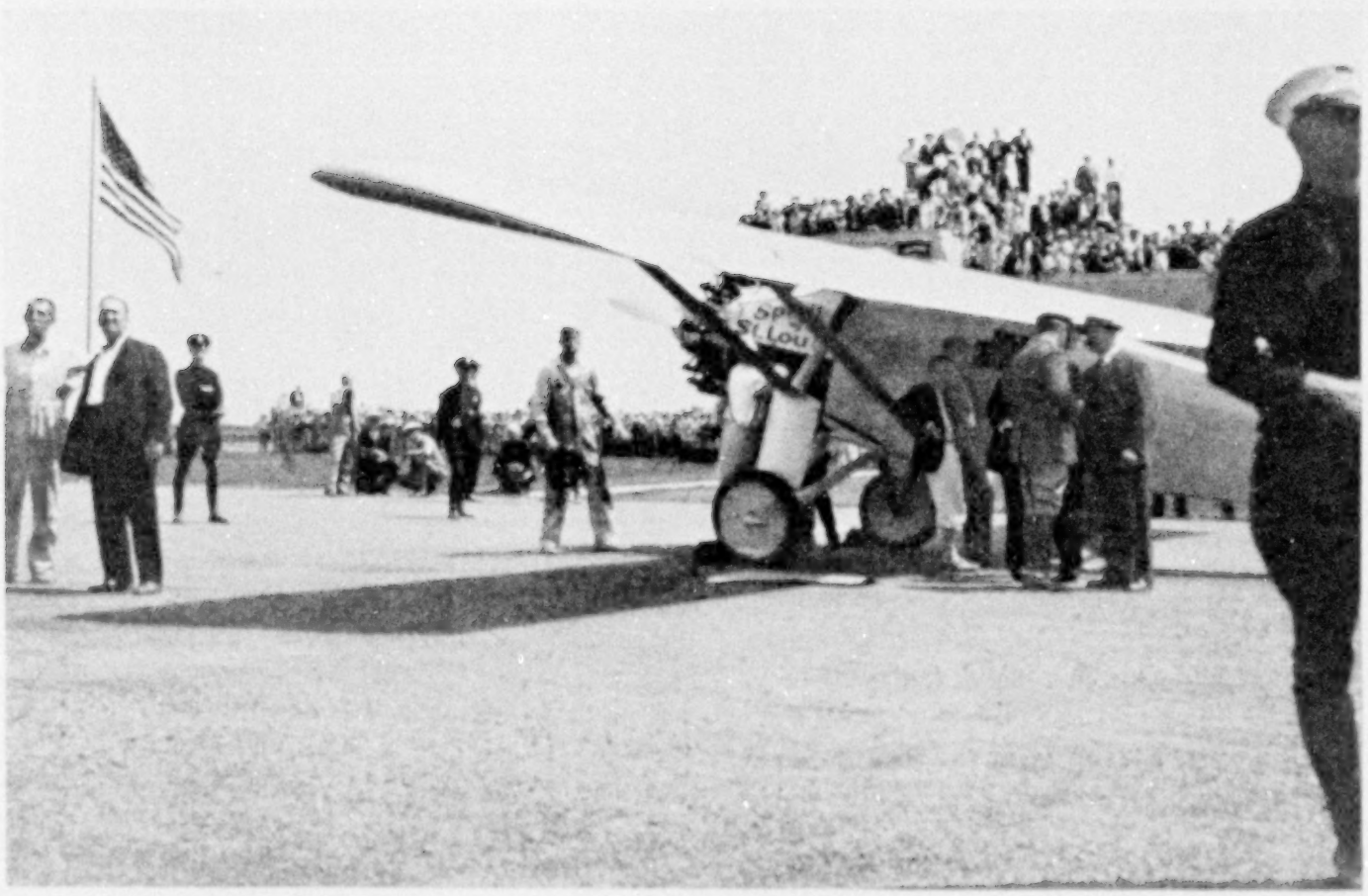
The tenth of August found us at Detroit. Before landing, we flew along the Canadian border for a view of the Detroit skyline, which makes a superb picture when viewed from a low altitude (see page 13). On the second day here Colonel Lindbergh invited Henry Ford to ride in the *Spirit of St. Louis*. This was Mr. Ford's first flight.

LINDBERGH'S MOTHER TAKES HER FIRST RIDE IN THE "SPIRIT OF ST. LOUIS"

The next city visited was Grand Rapids. Colonel Lindbergh's mother made the trip from Detroit to this city in a three-engine metal plane and returned that night after the banquet. Mrs. Lindbergh is an en-

A DAY OF REST ON LAKE ERIE

On board the *Lightnin'*, owned by the aviators' week-end host, Colonel Lindbergh is seated between Philip Love, pilot of the advance plane, and Lieutenant Keyhoe (below and in front).



JUST BEFORE THE TAKE-OFF AT BUFFALO

There was a slight delay here. When changing oil some one had overlooked priming the craft's pump, so that there was no pressure when Colonel Lindbergh started the engine. He saw this at once and switched off the engine, signaling the mechanic to take down the pump. Although this priming required 45 minutes, it did not result in his being late at Cleveland. A time allowance was always made for just such an emergency.

GROUND FLYING

Over flat, uninhabited stretches of country like this, Colonel Lindbergh would often drop down within a very few feet of the ground, looking for some object of interest. The shadow of the plane shows that in this case he was about 30 feet above the prairie. Frequently he flew even lower, so that at times he appeared, from the plane above, to be landing. At such moments as this the air traveler gets a real impression of speed, when the ground flashes beneath him. Higher up, the plane seems to be hanging still in the air, although the sped may be just as great.

thusiastic advocate of flying and is entirely devoid of any fear of the air. During the afternoon at Grand Rapids, Colonel Lindbergh took her for her first flight in the *Spirit of St. Louis* (see pages 14 and 15).

The trip to Chicago was made across the lower end of Lake Michigan. As we passed across the water, scores of lake craft tooted their whistles as signals of welcome. We spent Sunday at Chicago as guests of Mr. MacCracken and his friends, and took off on Monday for St. Louis.

This was a familiar route to Colonel Lindbergh and Love. Both had carried the air mail on the Robertson contract route between these two cities. Love seemed to know everyone along the line. He spent most of the time circling farmhouses and waving greetings to those below.

We stopped for two hours at Springfield and made a visit to Lincoln's tomb, which advanced our arrival at St. Louis to the middle of the afternoon.

Our advance party was almost left behind on the day we were due at Kansas City. Some one had slept late, and the result was a rapid drive to the airport. The policemen who interrupted the drive refused to believe Love's story about the tour, and a jail seemed more likely to be our next stopping place. Finally, the display of all our baggage convinced them and we reached the airport in time.

FUN IN THE AIR

The amount of our baggage always surprised reception committees. We carried four special suit bags containing three suits each, five hand bags, two brief cases, and a camera, besides a complete set of tools and spare parts. Almost all of this was transported in the advance plane. The *Spirit of St. Louis* could have carried this weight, but there was

Photograph by Kalee and Forster

THE CENTER OF THE AUTOMOTIVE INDUSTRY OF AMERICA MAY SOME DAY ENJOY SIMILAR DISTINCTION IN THE MANUFACTURE OF AIRPLANES

The reception accorded the United States Tour aviators at Detroit was one of the most enthusiastic of the entire itinerary. The Detroit skyline is here seen from Windsor, Canada.

MRS. LINDBERGH TAKES HER FIRST FLIGHT IN THE "SPIRIT OF ST. LOUIS"

Colonel Lindbergh's mother flew with her son long before he became famous, so that her first flight in the *Spirit of St. Louis* was no novelty, so far as the sensation of being in the air was concerned. Riding in this ship, however, could not but have thrilled her. The plane was designed to carry only one person, so that Mrs. Lindbergh had to sit upon the arm of her son's seat.

no baggage compartment, as all available space was taken up by gas tanks.

There was always an argument between Love and the rest of us about this baggage. He would go through the compartment, throwing out magazines, books, and pillows, which he claimed were unnecessary equipment. Sorenson and I maintained that the advance party should travel in comfort and peace.

An agreement to this effect was kept until Colonel Lindbergh heard of it. After this, whenever we were close together, he would fly straight ahead, so as to leave us in the disturbed air created by his propeller, with a result that we had a very bumpy ride for the next few seconds.

Love discovered that an unusual phenomenon would take place by suddenly pushing the control stick forward. Waiting until Sorenson and I were reading or asleep, he would push the stick ahead, thus causing the plane to nose down suddenly.

This maneuver made all the loose objects in the plane rise up in the air. Several times we found ourselves virtually floating up at the top of the cabin, in company with the camera and most of the baggage. After one or two hot arguments on this subject, we managed to persuade the practical joker that these tactics were unnecessary.

AVOIDS AIRPORT TO SAVE CROWD

At Kansas City the crowd was lined up along the runway of the new airport. Colonel Lindbergh could have landed, but there was a slight chance that he might have swerved into the throng. The time was so limited that he picked a spot several hundred yards away and landed. Here and at Portland were the only two places where he did not land at the airport as scheduled.

JUST BEFORE TAKING OFF

The engine had been started and all was in readiness when this last picture was taken of Mrs. Lindbergh before making her flight in the *Spirit of St. Louis*. In a cabin plane of this type, it was not even necessary for her to remove her hat, nor to don any special flying clothes. Colonel Lindbergh is shown wearing goggles, but these are for use when he peers out of the windows in landing. Ordinarily, there is plenty of visibility in modern airplanes, but in this ship it was necessary to install a huge gasoline tank directly in front of the pilot's seat, making the plane "blind," so that unusual care had to be taken in landing and taxiing. This is one of the reasons the airports had to be so carefully cleared of people at each stop. The cylindrical object above Colonel Lindbergh's head is the magnetic compass. This is the same one by which he set his course for Paris. It is suspended so that he can see it by raising his eyes slightly. The compass may be read from the side as well as from the top. The rest of the instruments are on the board in front of him.

We left Kansas City next morning and went on to Wichita. Governor Ben S. Paulen, of Kansas, was a passenger in the advance plane. It was his first flight, but he was able to pick out all of the cities along the route. He directed Love toward his home town, and had no trouble in finding his residence from the air.

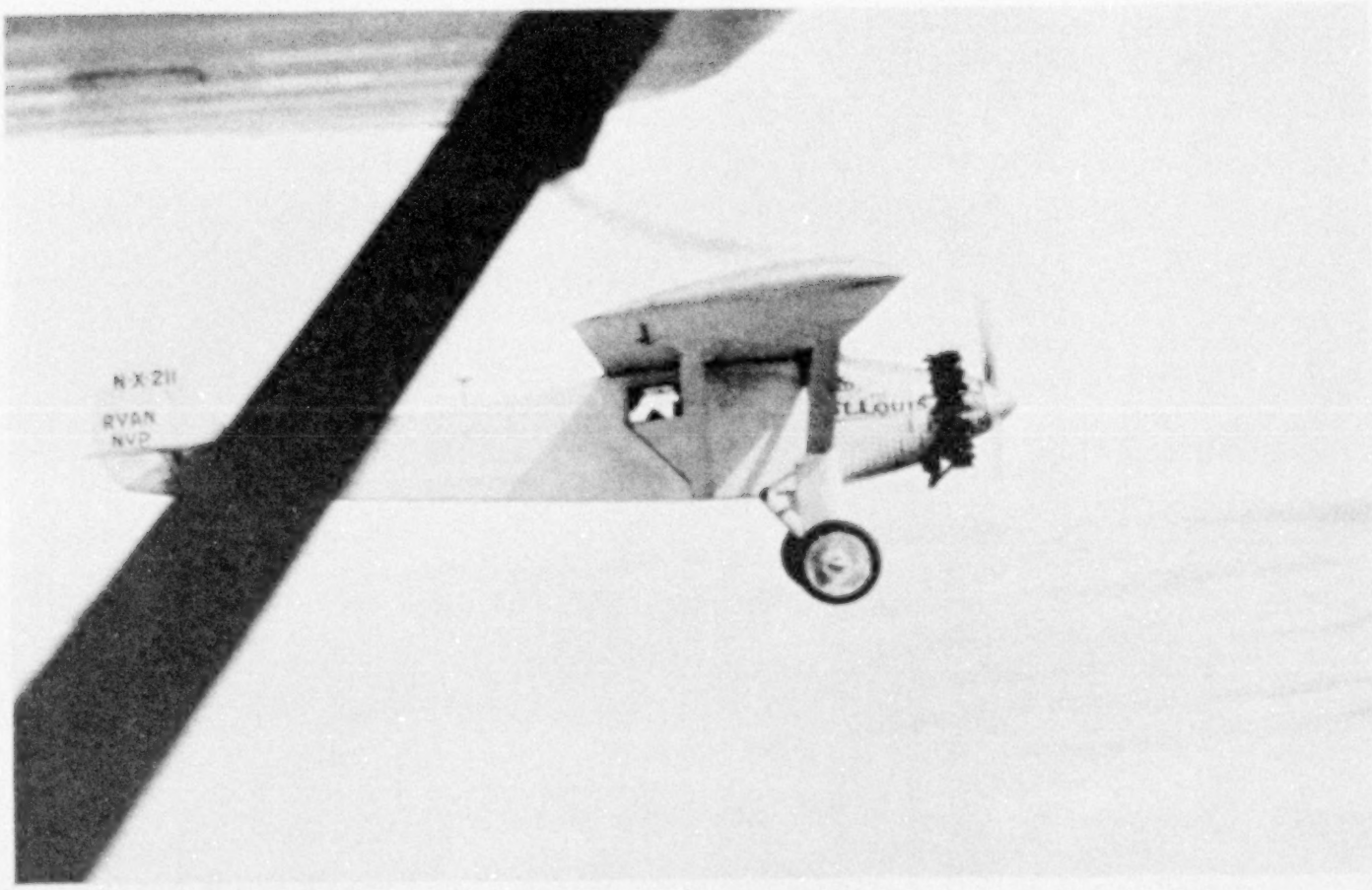
Our first early morning flight came at Wichita. We were scheduled to make a stop of one hour at St. Joseph, Missouri, and then to go on to Moline. There was some grumbling when we realized that we must get up at 3:30, but a good breakfast and a fine flying day soon put us in better spirits.

This part of the country is excellent for flying, as landings can be made at almost any point. We flew low over a great checkerboard of prosperous-looking farms (see illustration, page 20). Sometimes a few other early risers waved up at us.

The St. Joseph meeting was well conducted. We were sorry we could not stay longer, for this city has always been enthusiastic in supporting aviation.

LOST, A MAP OF IOWA

Love had some difficulty in getting us to Moline, for he had lost his map of Iowa and had to fly across the entire State by guesswork. In spite of this,



HANGING IN THE AIR

When two planes fly side by side, as in this picture, each appears to the other to be hanging in the air without any movement except that of the propeller. This is true except in "bumpy" weather, when rising and falling air currents send the entire plane up or down or cause a wing to tilt slightly for a moment. Flying together in this way is always interesting, for pilots can signal each other and can carry on dumb-show conversation for long periods when there is nothing of particular interest to be seen below. Although the speed of the planes is not apparent when flying parallel, a slight touch on the rudder bar of either plane will cause it to shoot rapidly off to one side, so that within one or two seconds there will be a wide space between them.

we reached Moline at 1:30, exactly on schedule.

We left our ships at the Moline airport, but the official visit was paid to all four of the so-called Quad Cities—Moline, Davenport, Rock Island, and East Moline. We spent the night at the quarters of Col. David M. King, Commanding Officer of the Rock Island Arsenal, and before taking off for Milwaukee we inspected the arsenal buildings and shops.

At Milwaukee we again met Lieutenant Maitland and Lieutenant Hegenberger, who were flying east in a three-engine Army transport, the same type of ship they has used in flying to Honolulu.

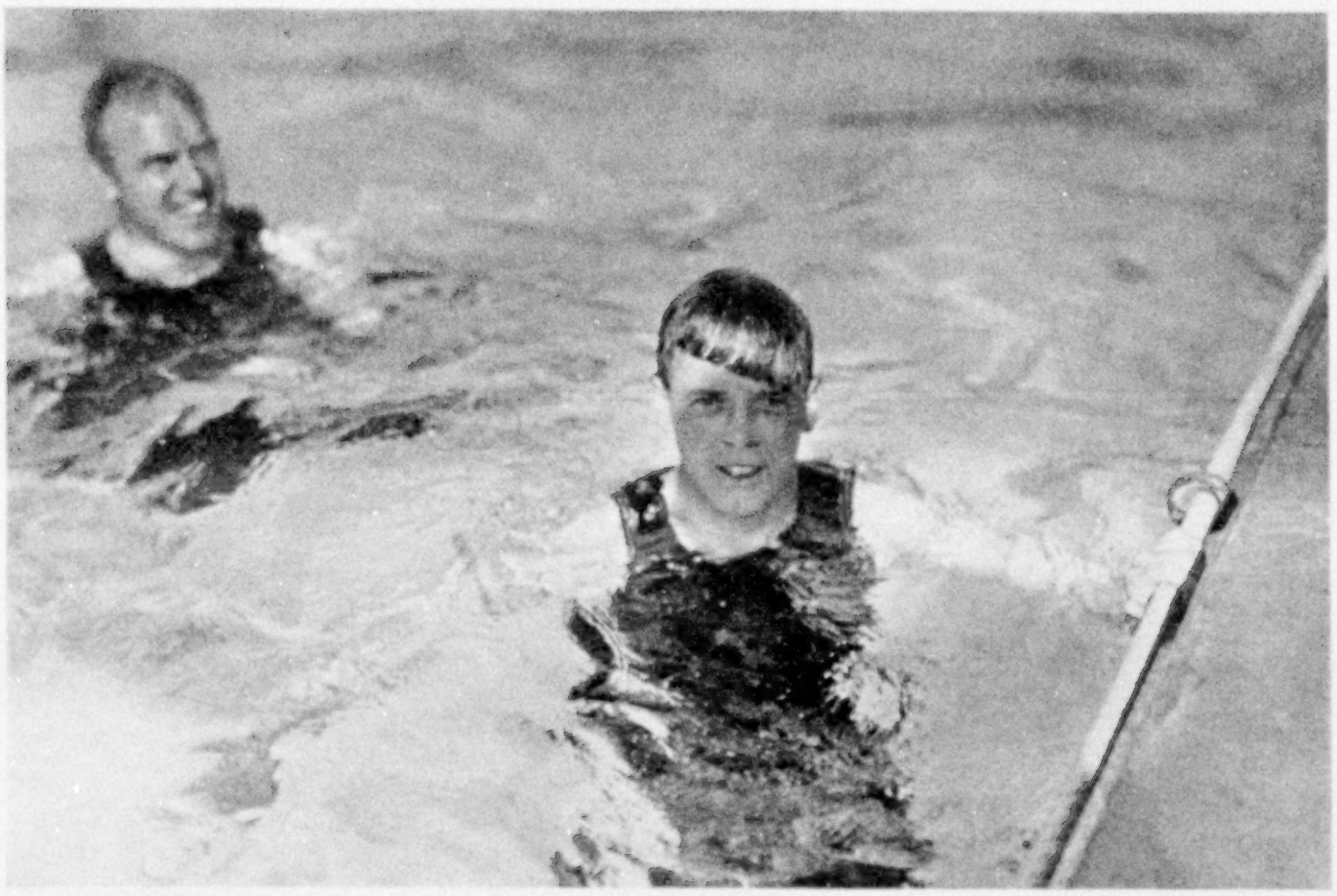
From Milwaukee we turned west toward Madison, where Colonel Lindbergh attended the University of Wisconsin before taking up aviation.

On the way to Minneapolis we deviated from our course to fly over the headwaters of the Mississippi. It was strange to see the source of the stream which we had already seen farther south as a great river.

At Minneapolis the crowd proved too much for the police at the airport. Several thousand people broke through the line on to the field, as Colonel Lindbergh landed, so that he had to head for the nearest hangar to avoid running into them. He was supposed to use a hangar at the opposite end of the field, but he had no choice.

MRS. LINDBERGH MAKES A FLIGHT OVER FAMILIAR TERRITORY

The time lost in getting the plane under guard and clearing the field cut the period for the Minneapolis program in half. We had agreed to be at the St. Paul city limits at a certain hour, and of course we had to keep our agreement. For this reason our visit to Minneapolis was rather short and our passage through the city was rapid.



A CHANGE OF ELEMENTS

This was a dangerous moment for the photographer, whose shadow unfortunately fell upon the Colonel in this picture. A second later he was the target for a heavy shower of water, the third impromptu bath he had received in trying to get this scene. It was the author-photographer's plight which caused the amusement registered on the face of Assistant Secretary MacCracken, of the Department of Commerce, who was one of Colonel Lindbergh's hosts at Chicago, where this picture was taken.

We all regretted this, but it could not be helped.

At this point we lost one of our party. Sorenson was recalled by the Wright Corporation and C. C. Maidment was assigned to take up his work.

After a rest day at St. Paul we left for Little Falls, Minnesota. Colonel Lindbergh's mother also made this flight as a passenger in the advance plane. This was familiar country to her, as she had flown over it several times with her son. She pointed out many landmarks which she recognized from the air.

From Fargo, North Dakota, which was our next stop, we turned south for a time. There was a short visit at Sioux Falls, and then we went on to Sioux City, Iowa. Here the committee had arranged the program so smoothly that it was completed ahead of time. The citizens and visitors from neighboring communities evidently had expected the delay which is sometimes a part of public ceremonies. At any rate, many of them missed the parade and it was necessary to make a second one.

The next two flights were over the great Iowa corn belt, from Sioux City to Des Moines and on to Omaha. Love had found his map of Iowa by this time, so that he did not have to fly down and read the names on the railroad stations.

After this we began a series of longer jumps. On the hop from Omaha to Denver, Colonel Lindbergh flew about 590 miles. This was slightly more than the advance plane covered, as he had to fly over five or six cities which were not on the course.

September 1 had been scheduled a rest day. We decided to use it for making a flight to Pierre, South Dakota, as there had been only one short visit in this State.

A HERD OF RANGE HORSES ENCOUNTERED IN THE BAD LANDS

As we left Denver we circled around Longs Peak, and then past Estes Park and

ST. LOUIS, CHILD OF THE FATHER OF WATERS

Up the Mississippi, long ago, came the French fur traders to found the trading post that became St. Louis. Now this mighty city, with its 22 railroads, its river traffic, and its net of motor highways, ranks among the great manufacturing and exporting centers of the world. And, curiously enough, its fur trade is bigger and brisker than ever—in fact, St. Louis is now the world's greatest raw fur market. Colonel Lindbergh's plane appropriately bears the name of this splendid metropolis in the heart of the Nation.

the Colorado National Forest. We followed a straight course across Nebraska, and the plains of that State were soon left behind. Passing over the border of South Dakota, we came upon the Pine Ridge Indian Reservation, and dropped down to view these descendants of the first Americans. A little bit later the Bad Lands came into sight.

As we came up on to a plateau we were surprised to find a herd of range horses. This was many miles from the nearest habitation we had observed. Quite evidently these horses had never seen an airplane before. As we swooped down to look at them, they separated and dashed away terror-stricken.

We followed a few of them clear down into the bottom of the Bad Lands.

We found another herd before reaching Pierre and attempted to get some pictures. This was very difficult, as the plane was

Official Photograph, U. S. Army Air Corps

ST. PAUL, MINNESOTA, FROM THE AIR

This was one of the few places where some difficulty was experienced on the United States Tour. When landing at the Minneapolis airport Colonel Lindbergh was forced to taxi hastily into a hangar at one side to avoid the huge crowd, which had broken through the police lines and was rushing out on to the field. Because of this the period which would have been available for the program at Minneapolis was reduced to half an hour, so that it was necessary to make a rapid passage through the city instead of a more leisurely parade, which had been planned (see text, page 16).

moving rapidly and the horses would swerve in the other direction when we got down near them (see illustration, page, 22).

A MESSAGE DROPPED AT THE SUMMER WHITE HOUSE

We took off from Pierre early the next morning and followed a straight course to the President's summer home, near Rapid City. Colonel Lindbergh came down low and dropped a message which we found later was delivered to Mrs. Coolidge. There were several people grouped on the steps, but he could not recognize them because of the speed in passing.

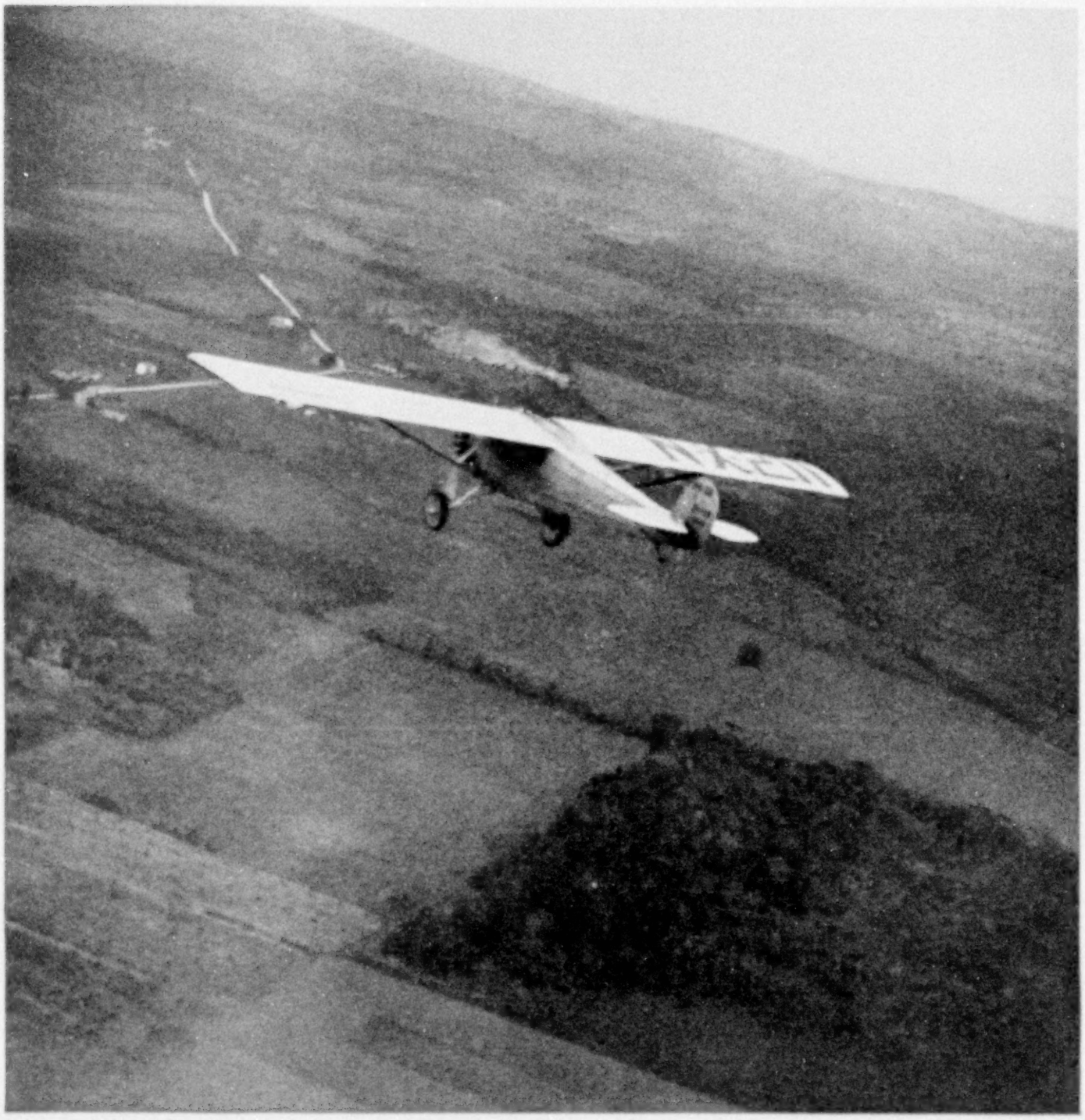
The advance plane was forced to stay at a higher altitude because of its heavy load. We could not gain altitude quickly and might have had trouble in getting out of the pass.

From the Summer White House we went on past the Black Hills, Sheep Mountain, Harney Peak, Rapid City, and Deadwood. From Custer, near Wind Cave National Park, we crossed over the border into Wyoming. From here we followed a fairly straight course past Fort Laramie into Cheyenne.

WHEN A MAP BECOMES ALIVE

Reading the map on such a flight as this is an interesting game. There was always something to be seen. The cross-country pilot becomes used to seeing his map take life in the country that passes below him. Only from the air can a traveler get this feeling of having the earth moved by for his inspection. He glances at the map and sees a mountain range indicated at a point eighty miles ahead. At the moment there is only a level prairie beneath him, but within a few minutes a bluish haze shows on the horizon. This is the mountain range, still more than 50 miles away.

To check his location he looks again at



FLYING OVER A CHECKERBOARD OF FARMS

From an altitude of 2,000 feet or higher, farming lands present a huge checkerboard appearance. Sometimes the units are irregular in shape, but in many places, as in the Middle West, they are extremely uniform. In this picture Colonel Lindbergh had just surprised the occupants of the advance plane by shooting by at high speed when they did not know that he was within miles of them. He had deviated to fly over a city and caught up with them unexpectedly. His ability to do this demonstrates his accurate knowledge of air navigation, for in each case he had to figure a problem considering both the ships' speed and the location at the last time they were together. The slight tilt of the wings was caused by the right turn in which the *Spirit of St. Louis* was swinging. The white triangle at the upper left of the picture is a highway which formed one of the many landmarks used in flying cross-country.

the map. There should be a river running diagonally across the course 15 miles farther on. Ten minutes elapse and the river is directly below. It twists through the foothills just as the black line twists across the map in his hand.

Cruising back and forth in this way, the flight to Cheyenne seemed short, although it took more than six hours. We were soon down on the ground again, meeting the reception committee and starting upon another program.

Several desired deviations from the course to Salt Lake City made us start

Official Photograph, U. S. Army Air Corps

THE STATE CAPITOL AT DENVER, COLORADO

After circling over the dome on leaving Denver, Colonel Lindbergh climbed up higher for a close view of Longs Peak. From here he went on past the Rocky Mountain National Park and Estes Park.

early. We did not fly the air-mail route, but headed south over Clarks Peak, Steamboat Springs, and Craig, Colorado. Farther on, we flew over Strawberry Peak and Provo, Utah.

GREAT SALT LAKE APPEARS IN MINIATURE

We came over the mountain range at a high altitude, from which Great Salt Lake and Salt Lake City seemed to have been constructed in miniature. We descended slowly and watched the old city of the Mormons take form beneath us. The great Tabernacle stood out distinctly. Several miles to the west we saw a terraced ledge and came down to look at it. We found that this was the Bingham Copper Mine. A dozen trains moved back and forth on these ledges with their loads of ore.

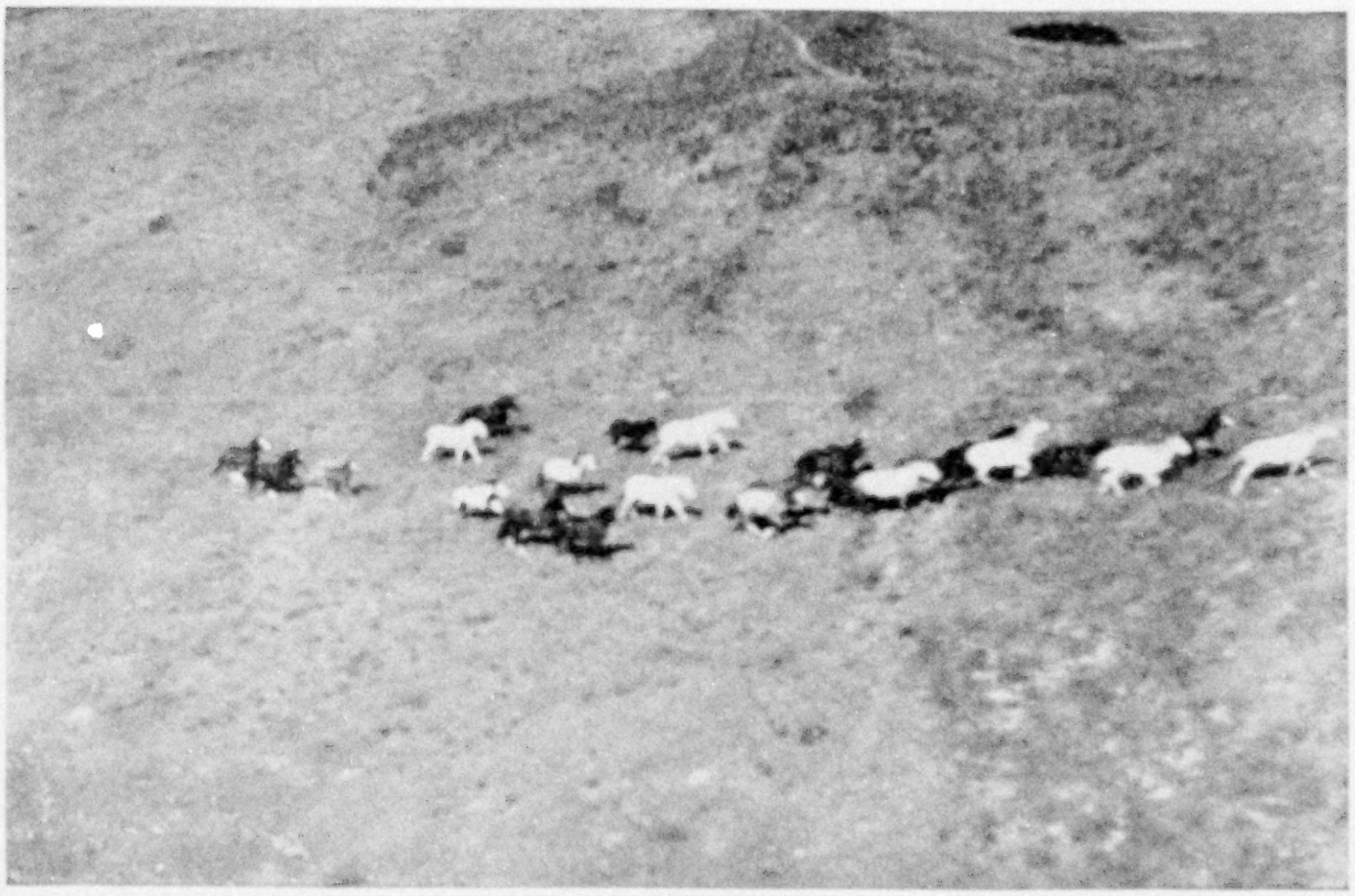
The trip from Salt Lake City to Boise, Idaho, took us over Great Salt Lake, with its railroad causeway extending completely across from east to west. We flew at a low altitude, but saw only a solitary boat off to one side.

Our course for Butte lay over the Sawtooth Range and the Salmon River. The Sawtooth Mountains live up to their name, as they rise to very sharp peaks for miles and miles.

There were many picturesque scenes along this range. At one spot we saw a deep hollow in the side of a mountain, rounded as if it had been turned out in a huge lathe, except where it had been broken at one side. The bottom was constantly in shadow because of the overhanging rim. There was a layer of snow at one side, though this was below the point where snow would usually be found (see illustration, page 25).

EMERGENCY RATIONS CARRIED ON FLIGHTS OVER MOUNTAINS

In all our flights over mountainous or sparsely settled country we carried emergency rations and canteens of water. We did not expect any trouble from our engines, but we were prepared for forced landings. Even in the worst of the mountainous country, we saw many places



RANGE HORSES IN SOUTH DAKOTA GET THEIR FIRST VIEW OF A PLANE

Far out, near the Bad Lands of South Dakota, the two planes came across a herd of range horses. Apparently they had never seen an airplane, for they showed the greatest fright as the aviators swooped down for a close view. The few domestic horses seen on the tour in the eastern part of the country did not display such terror as these range horses showed.

where we probably could have landed without injury to ourselves.

We did not carry parachutes, for there was no need for them. Parachutes are valuable for experimental, military, and air-mail flying. In such operations, pilots work under all kinds of conditions. In commercial flying, of which our tour was an example, parachutes would have been a detriment as added weight.

"DAYS OF REST" SPENT IN FLYING

Our arrival at Butte was to have been the beginning of a vacation, but we decided to take one day of this period for a visit to Helena. We also decided to make long deviations on the flights to and from Helena, but we did not announce this.

Glacier National Park was the reason for the first change of course. We reached the park after flying over Swan Lake, Mission Range, and Flathead Range.

This journey over Glacier Park was well worth the effort of the entire tour. One snow-capped peak after another sent us circling about it in admiration. Once we broke through a patchy layer of clouds and flew above it in the sunlight. Here and there a higher mountain projected through like an island at sea (see illustration, page 26).

Cruising leisurely, we saw practically all of Glacier Park in a few hours. It would take months, and perhaps years, to cover it, using any other method of transportation. Even then it would not be so satisfactory, for if we wished a better view we had only to climb higher or to fly around at a different angle.

Regretfully, we left the park and flew back over Mount Slyen and Mount Cleveland. We also saw the Blackfeet Reservation and circled over Great Falls. A strong wind was blowing as we turned toward Helena. We had to run our engines at nearly full throttle to arrive on time.

There were several inquiries as to what had happened to us between Butte and Helena. The distance is only about 80 miles and we had taken six and a half hours to get there. We explained vaguely that we had been circling around. We

FLYING OVER THE BLACK HILLS OF SOUTH DAKOTA

On the way from Pierre, South Dakota, to Cheyenne, Colonel Lindbergh deviated from his course in order to fly over President Coolidge's Summer White House, near Rapid City. This took him over the heavily wooded slopes of the Black Hills. Over territory of this kind the modern aircraft engine proves its worth, for pilots now have little fear of forced landings.

were afraid some one might try to dissuade us from flying over Yellowstone the next day.

A VISIT TO THE WONDERS OF YELLOWSTONE NATIONAL PARK

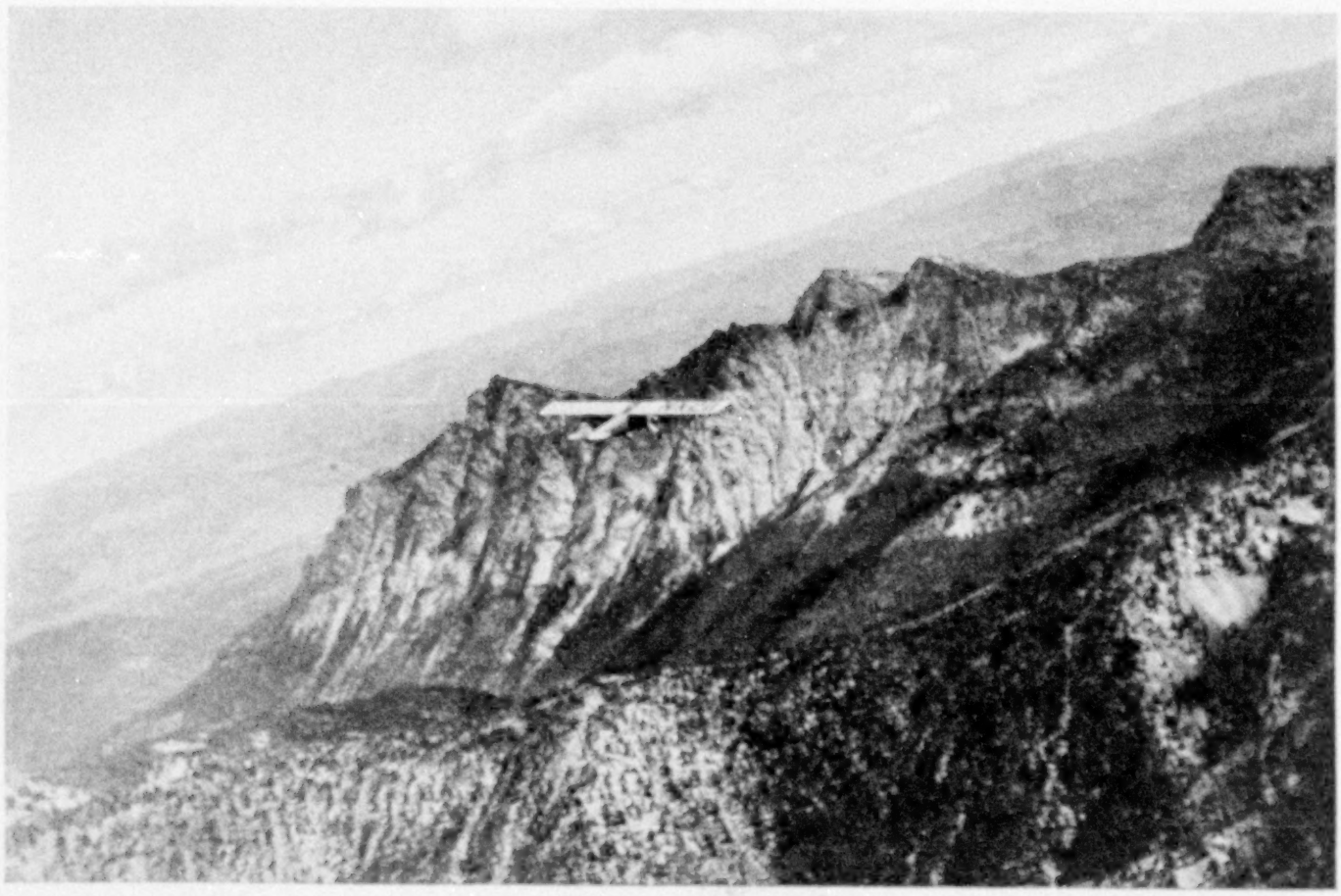
The next morning we again took off early, with the famous Yellowstone National Park as our objective.

On the way across the Montana plains we saw herds of sheep and came down rather low to wave at the herdsman. The effect was not what we had expected. The sheep became alarmed and closed in from all sides. In a few seconds they had wound themselves into a huge spiral, which became tighter as each one tried to get near the center (see illustrations, page 29).

The herdsman stood shaking his fist at us. We did not seem to be welcome visitors, so we zoomed up from the milling sheep and went on.

On the way to Yellowstone Park we passed by the Big Belt Mountains, Crazy Mountains, and the Cayuse Hills. We also circled Billings before heading westward again.

While still in the plain country we saw a group of curious formations. They were



EXPLORING THE COUNTRY A LITTLE OFF THE BEATEN PATH

There is no "beaten path" in the air, of course, but between certain cities flyers usually pass over the same territory in regular flights. Many times, as in this instance between Cheyenne and Salt Lake City, the aviators deviated to explore the less visited sections, or to get a glimpse of a desolate stretch that offered some added interest. Apparently, there was no landing place, if such a spot had been needed at this point. In reality, however, there was an almost flat area to the right, just off from the ridge shown in the foreground. The plane could have been banked into a turn and have made this ground safely. To the left of the mountain ahead of the ship may be seen a perfectly flat stretch which could also be used, if an intermediate field were desired in this part of the country for regular operations.

apparently rocks, but from a little distance they looked like huge batches of dough dropped close together. There was no connection between them. They appeared to be resting upon the ground rather than to be a part of it. We found later they were sandstone towers, eroded to their present shape in centuries of time (see illustration, page 27).

IN CLOSE QUARTERS FLYING THROUGH A MOUNTAIN PASS

We had some trouble in getting through the clouds that blocked most of the mountain passes to the south. At last we made it, although the two planes were separated for a time. We came together again over Yellowstone Lake and flew close to the surface until we reached the shore near Old Faithful Geyser. We had hoped to find it in action, but we were too early. The gas supply in the advance plane was running low; so, after an inspection of other geysers we went on our way.

It was now late in the afternoon, so we headed straight for Butte. Soon we found it was not so easy to get there. Heavy clouds extended down into the passes, so that we had to fly within 100 feet of the ground to get through. This was not so bad, except in case the pass became "blind"—that is, choked with clouds.

In such a case, to avoid flying through without any knowledge of what was ahead, with the possibility of crashing into a mountain side, we should have had to turn about at once. In such close quarters this would have been hard for the two planes to do at the same time.

Luckily, the pass stayed clear and we came out on the other side to find ourselves nearly leveled off for the landing at Butte.

Kusterer had retraced his steps to Butte to take part in our vacation. He was the

AMONG THE CLOUDS IN GLACIER NATIONAL PARK

The lure of this beautiful mountain range proved too much for the flying-around-the-country party. On the flight between Butte and Helena, ordinarily covered in about an hour, they deviated far to the north, spending two or three hours circling over the park. This particular spot is a craterlike hollow, one side of which has been broken away. At the upper left the top of another mountain can be seen projecting through the clouds like an island.

first to greet us. I noticed that he had a very worried look.

"You'll have to get another advance man," he said, shaking his head. "I can't stand this much longer. You've been reported cracked up all the way between here and Helena. Where have you been for the last five hours, anyway?"

"Waiting for Old Faithful to spout," we told him.

"But Yellowstone is 250 miles from here," he objected. "What were you doing way down there?"

"It was only a little bit off the course," Love said, with a grin.

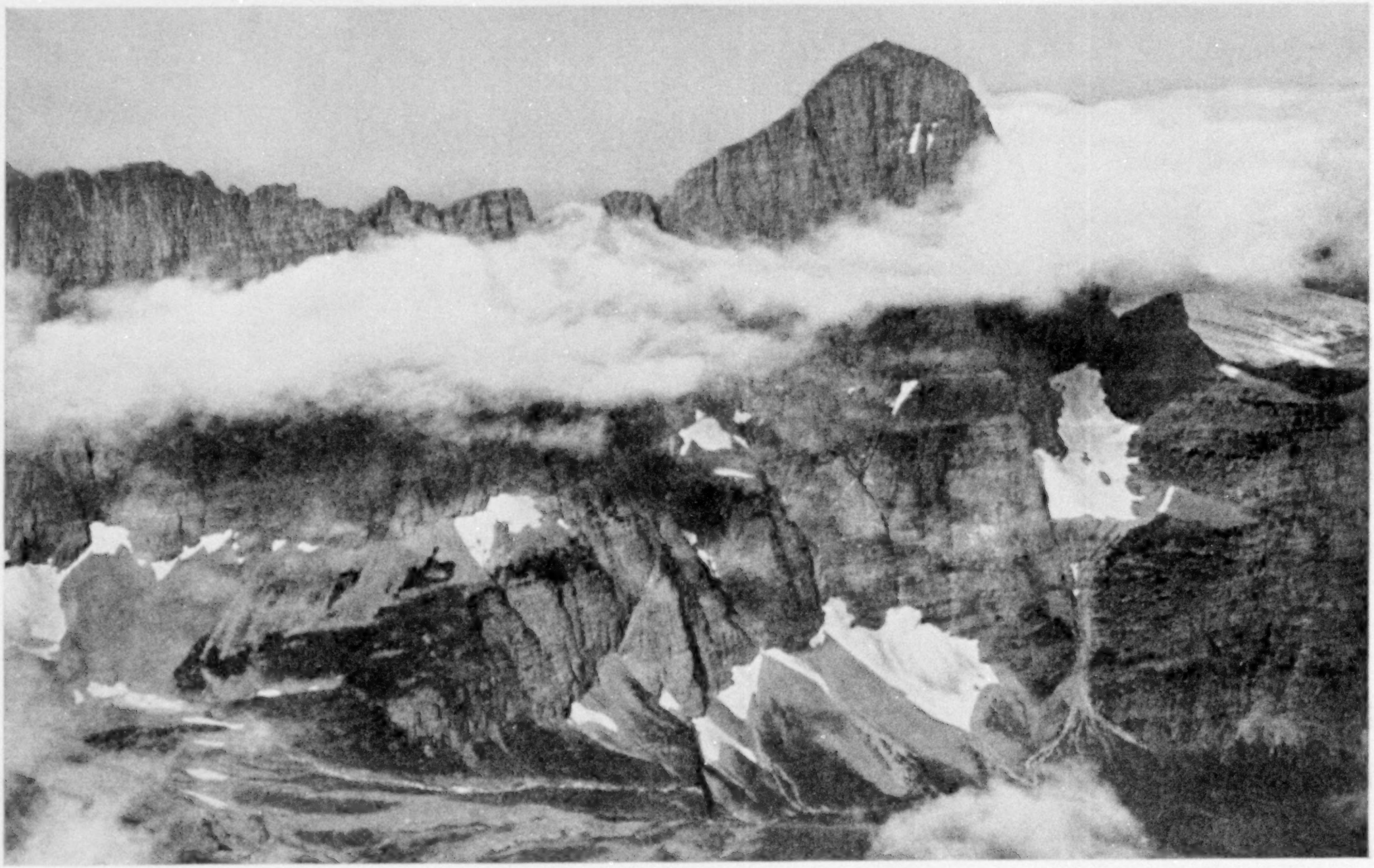
Kusterer winked at the rest of us. "I guess the next thing you'll be saying Cincinnati is on the route between here and Spokane," he remarked.

Love subsided at this, for Cincinnati still seemed to hold an unusual attraction for him.

That night we had an opportunity to visit a copper mine. In company with our hosts at Butte, we were swiftly dropped to the 2,800-foot level of the mine. A very interesting hour was spent watching the miners drill holes for the dynamite charges, exploring the different lateral shafts and listening to explanations of the methods used.

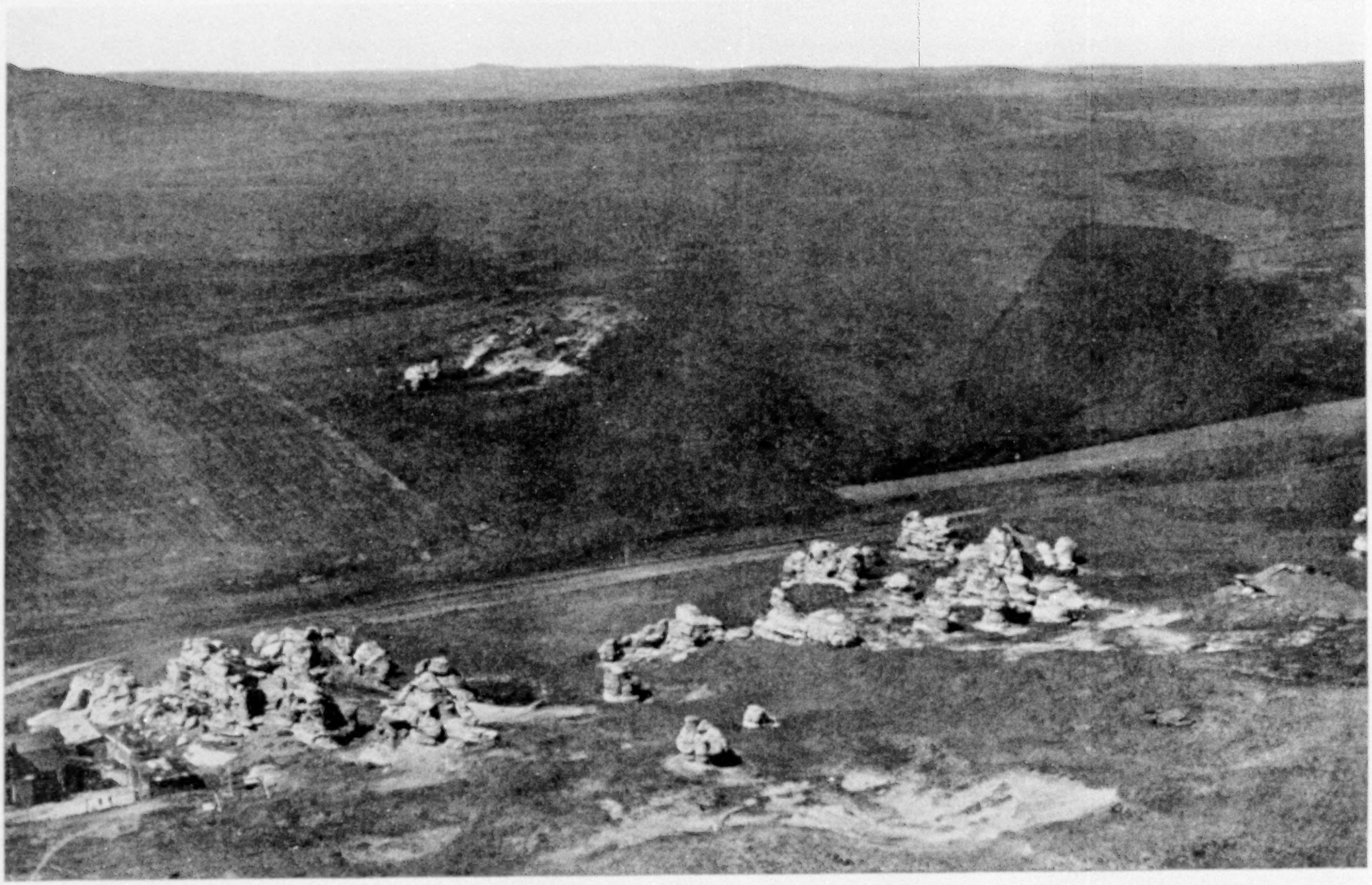
"SNIPE" AND "BEAR HUNTING" IN MONTANA

A rest from the series of programs began the next morning. Love and Maidment decided to stay at Butte to work on the planes. The rest of the party went up to a camp on Elbow Lake, where we were the guests of Mr. John D. Ryan. With Mr. Carlos Ryan, Mr. John Hobbs, and others we spent the time shooting, fishing, and thinking up tricks on some one of the outfit.



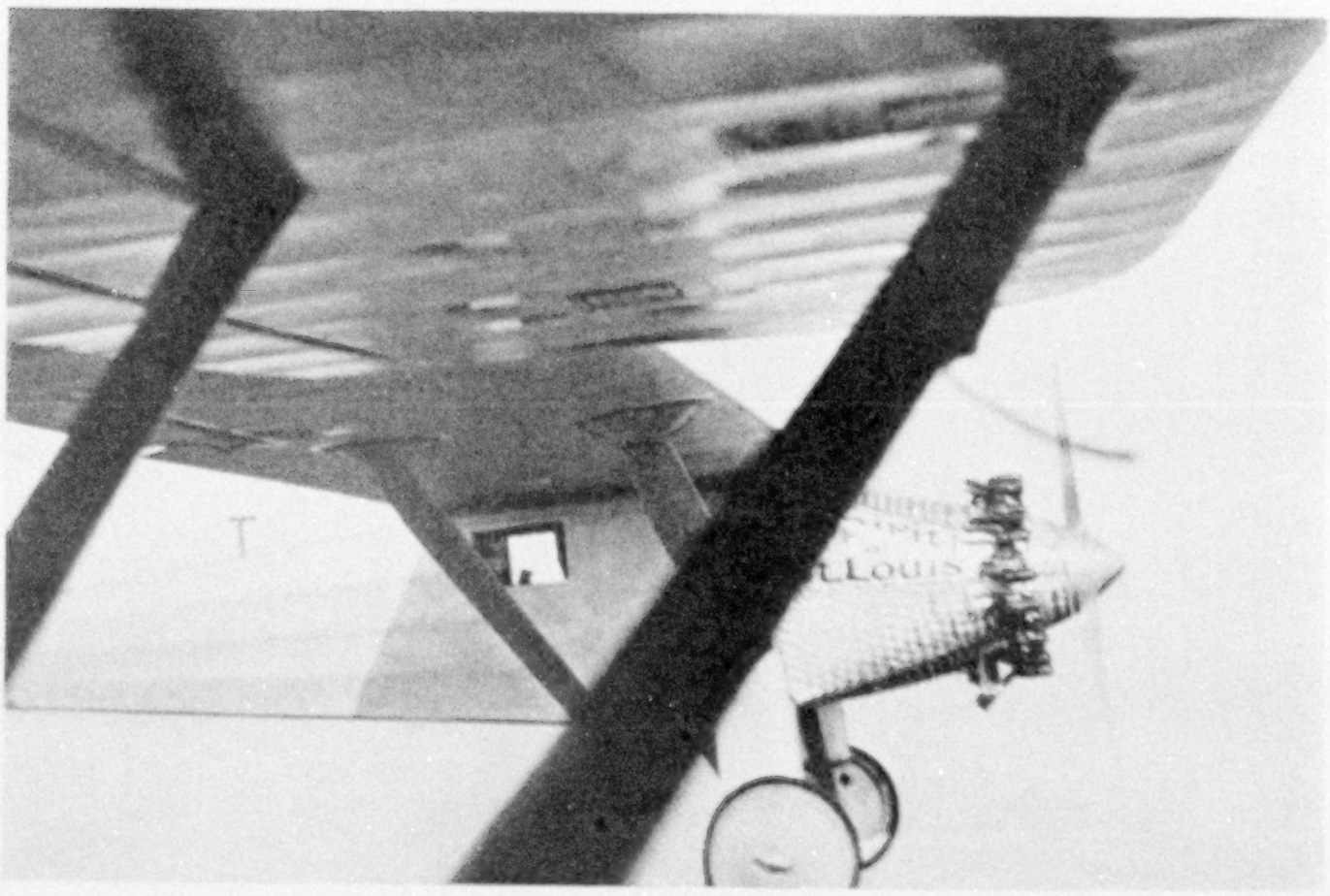
IN THE LAND OF CLOUDS AND ROCKS AND SNOW

Flying among the peaks in Glacier National Park was not difficult on this day because of the scarcity of clouds. If there had been a heavy cloud layer, the planes would have been forced to fly high, as otherwise there would have been great danger of striking a mountain hidden among these fleecy masses. There were very few snow-capped peaks at this point, although here and there, in the shadow of the range, patches of snow were found.



LOOKING DOWN UPON SANDSTONE TOWERS BETWEEN BUTTE AND HELENA, MONTANA

These rock formations, which from the air resemble bits of biscuit dough, have acquired their fantastic appearance through weathering and erosion. They are one evidence that this part of the country was not glaciated, since the great ice masses scoured away such obstructions. The ranch house, built close up against these rocks, seeks protection from the biting winds that blow in this nearly treeless region.



FLYING WING TO WING

The picture was taken just as the *Spirit of St. Louis* overtook the advance plane. Projecting above the window ledge of the former is the map which Colonel Lindbergh was using to guide him across this part of the country. The T-shaped projection above the fuselage is the wind vane of the earth induction compass which guided the ship to Paris. Although the propeller seems to have stopped still, it was moving at the rate of about 1,500 revolutions per minute when the picture was taken.

We found that one member of the tour party had never heard of a snipe hunt. We explained the details to him very carefully. That night found him sitting beside an open sack out in the thickest woods, a lantern beside him, and in his hand a large bell, which he rang continuously to attract the wary snipe.

The rest of the party had left him with the understanding that they would go out and drive in the snipe. After an hour or two the victim began to suspect that all was not well, for no snipe had shown up. After getting lost on his way back, he finally reached the camp and found every one comfortably seated around the fire.

The snipe hunter took this so good-naturedly that a more elaborate stunt was planned for his benefit. Early in the morning a loud yell came from the cook tent. The guides ran over hastily. The cook pointed to a torn spot on a quarter of beef hanging from the ridgepole. By this time the intended victim had arrived. The cook explained the trouble with many gestures.

"Bear!" he exclaimed. "He was right in here, clawin' at that beef, when I woke up."

Bear tracks were found outside the tent, leading away into the woods. Charley, one of the guides, nodded to himself.

"He's a big one," he said to the cook. "You keep your eyes open and give me a yell if he comes in again."

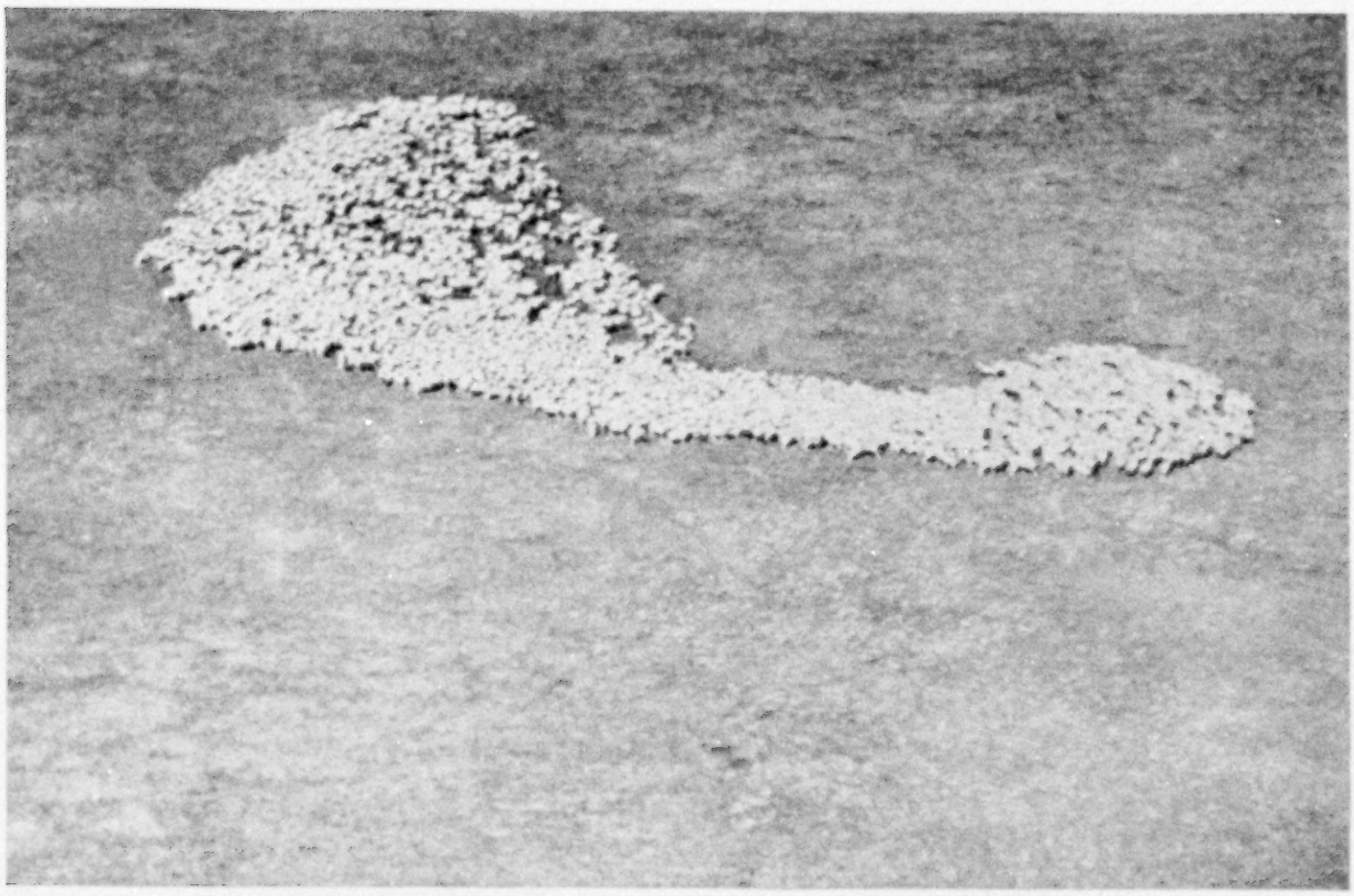
The cook snorted.

"I'm not goin' to sleep in that tent," he declared. "No bear is gettin' that close to me again."

"What are you going to do?" the snipe hunter asked the guide.

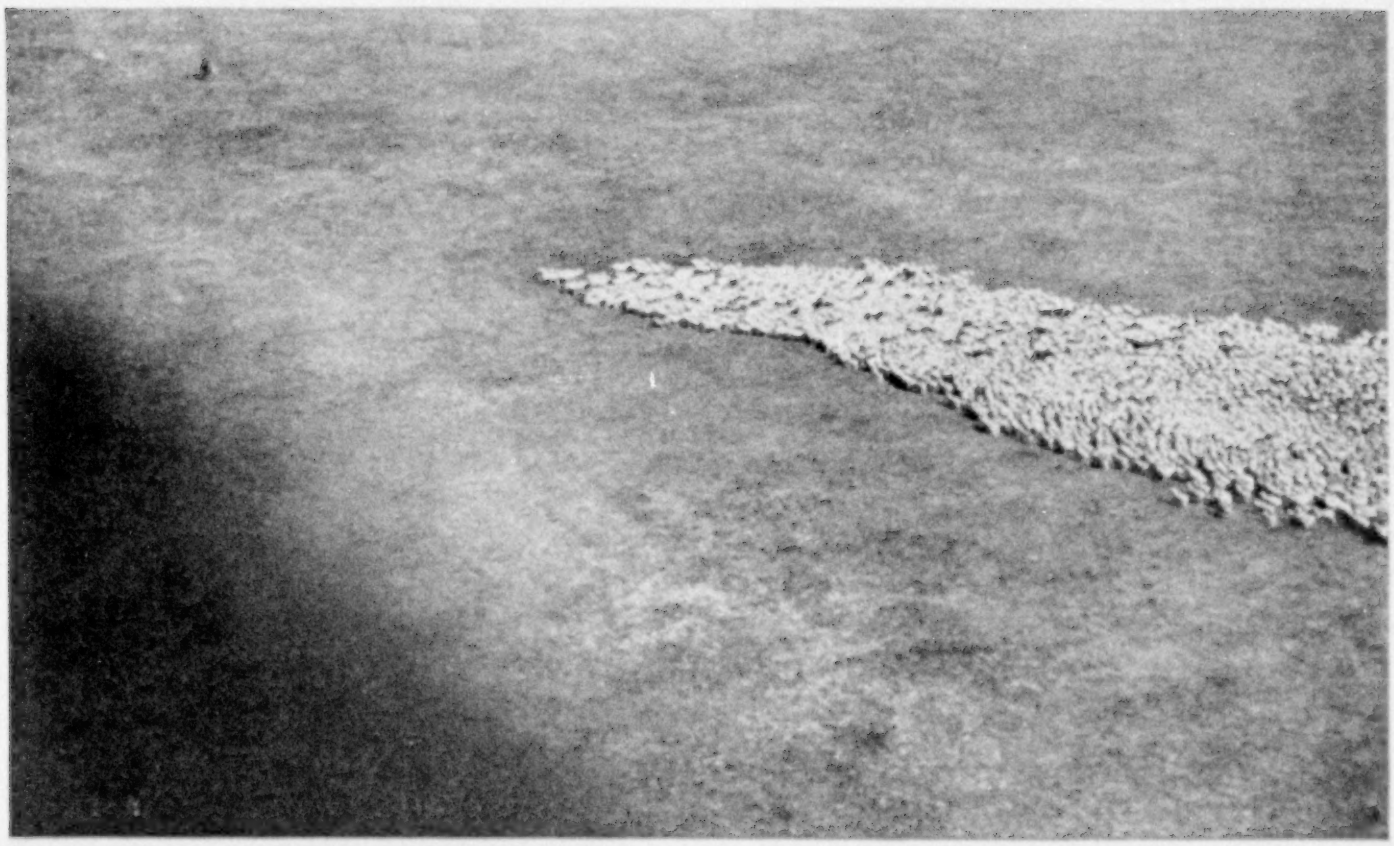
"I'm going to get that bear," was the reply. "He'll be in here again after dark to-night."

The visitor begged to be taken on the hunt. Charley at first refused, but at last gave in on condition that the other man would not carry a gun.



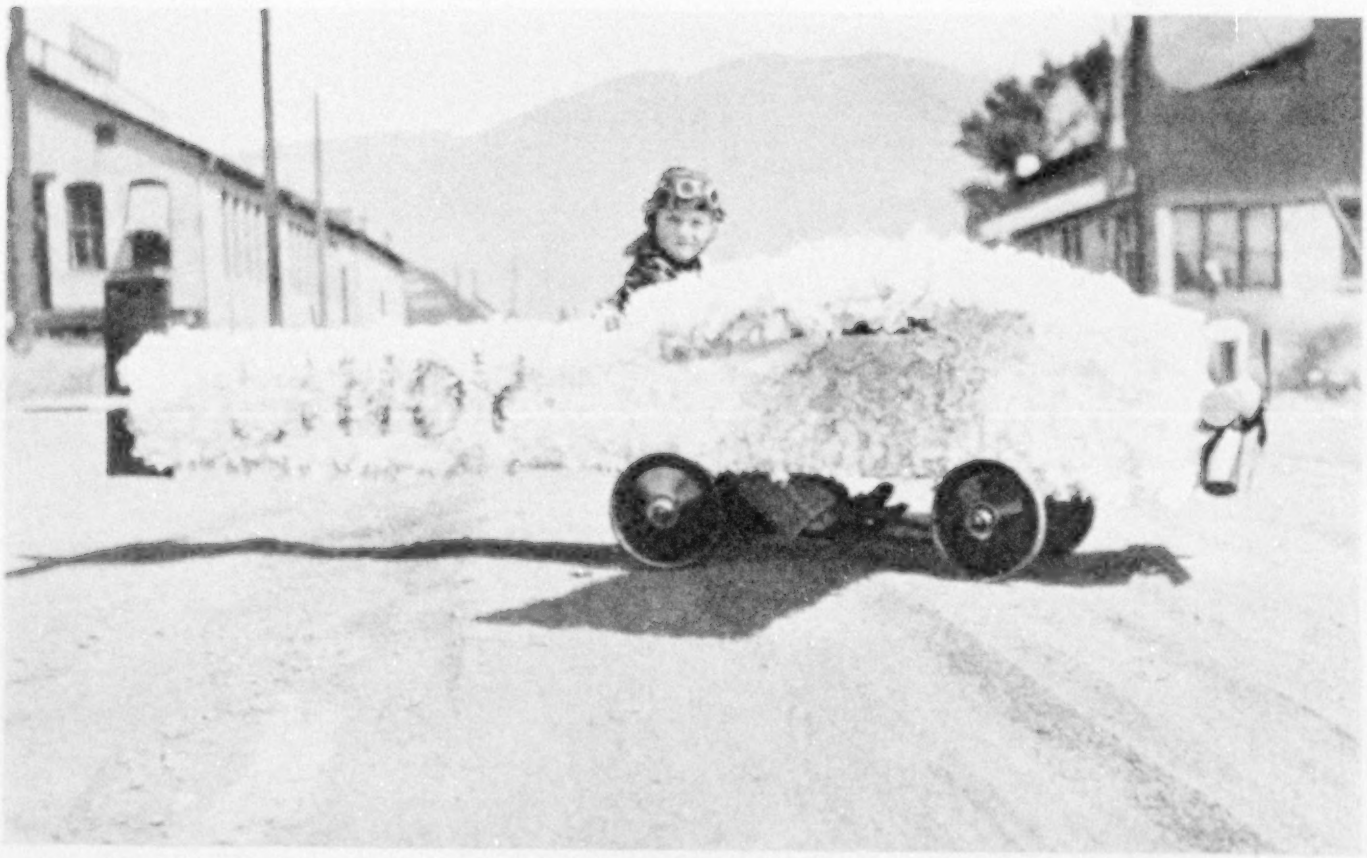
AN UNEXPECTED GAME OF "RUN, SHEEP, RUN"

While flying over Montana a herd of sheep was seen below. Colonel Lindbergh dropped down to see them. The effect was somewhat surprising. The sheep became panic-stricken and closed in from all sides with utmost speed. In a few seconds they had formed a tight spiral, each sheep trying its best to get into the center (see text, page 23).



NOTE THE ANGRY SHEPHERD IN THE UPPER LEFT CORNER

For once Colonel Lindbergh did not seem to be such a welcome visitor, for the herdsman stood shaking his fist violently at the *Spirit of St. Louis*. After circling to the other side of the herd and driving it back toward the herdsman, Colonel Lindbergh zoomed upward and went on.



ONE OF LINDBERGH'S FOLLOWERS

Master Billy Howard, of 636 Brooks Street, Missoula, Montana, won first prize with his flower airplane in a pageant at this northwestern city. He is only one of the hundreds of thousands in the United States who dream of following Lindbergh through the skies. The letters received from these youngsters all express the hope that they, too, will some day be famous flyers.

"You might get excited and take me for the bear," he explained. "We don't want anybody getting shot up here."

That night the whole party was gathered around the fire when a slight commotion sounded from the direction of the cook tent. A few seconds later the guide ran up and signaled the erstwhile snipe hunter. Together they disappeared into the darkness of the woods.

In a minute or two a shout was heard. Then came a couple of shots. After this we heard a louder yell. It was Charley's voice.

"The gun's jammed! Follow me, we've got to run for it."

The sound of this had hardly died away when we heard some one dashing along the trail. Past us went the would-be bear hunter, straight for the gun tent.

"Got to help Charley," he gasped. "Poor fellow, he couldn't run fast enough."

Just then Charley himself appeared, rather out of breath.

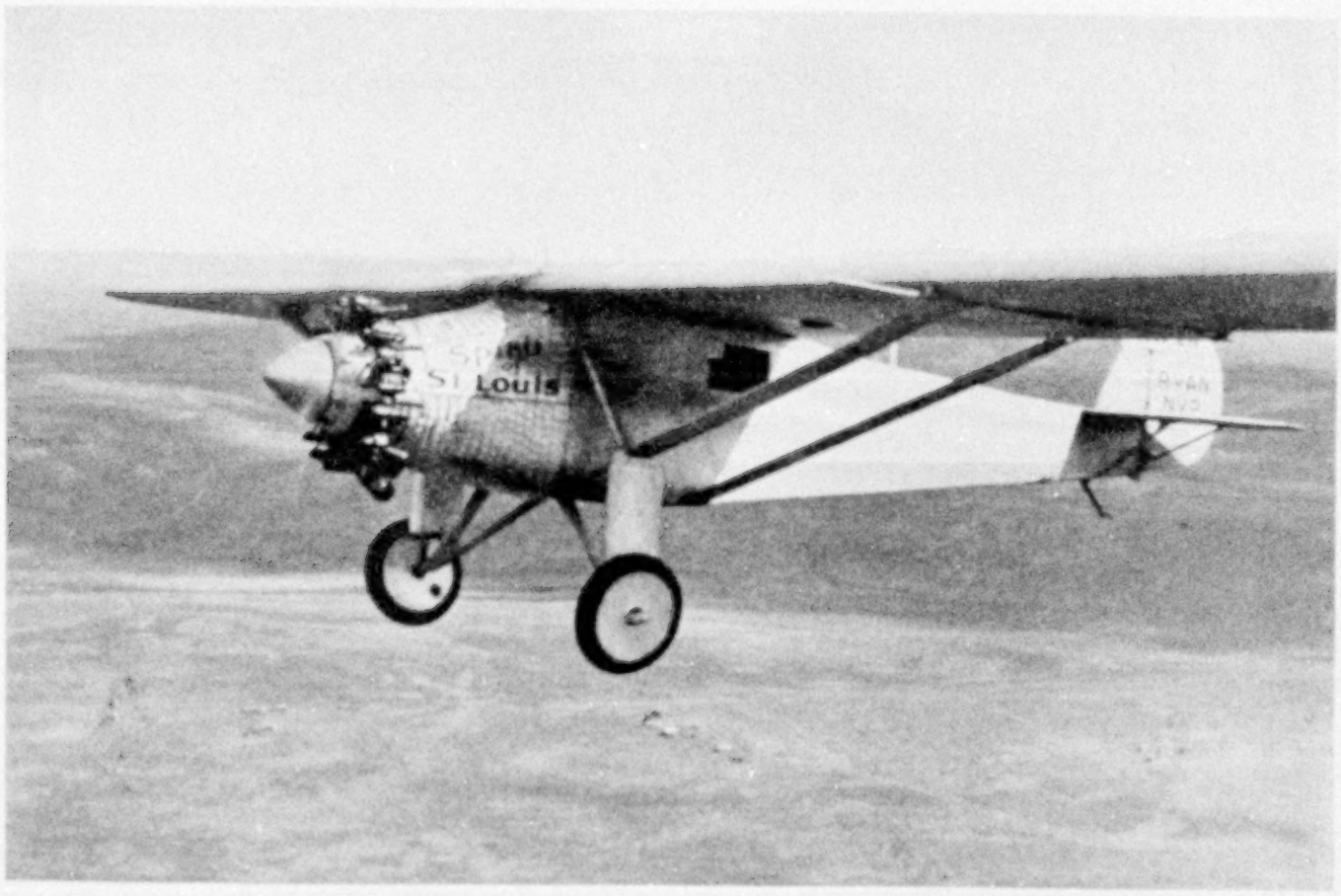
"Say, that fellow doesn't need any wings to fly," he wheezed. "He's an airplane all by himself."

"Shorty" Lynch, Colonel Lindbergh's former flying partner, was the last one to be a victim. Some one found him dozing on his cot, fully dressed. A noose was laid around one of his boots and the end of the line was thrown over the ridgepole. At a signal he was jerked abruptly from his sleep and drawn skyward. His shoulders remained on the cot, but his efforts to release himself were useless. He remained in this position for 15 minutes, while all members of the camp were invited to make an inspection. After he had been photographed several times he was cut down.

ARMED PREPAREDNESS IN CAMP

A result of all this was a state of armed preparedness in each tent. No one felt very safe in going to sleep, but the camp at last was quiet.

On Sunday we returned to Butte. The next morning we said good-bye to our hosts and started for Spokane. It seemed good to be flying again, although the weather was chill and rainy. We flew over Anaconda, Missoula, and the Bitterroot Mountains. A little later we en-



OVERTAKING THE ADVANCE PLANE

It was always easy for the *Spirit of St. Louis* to catch up with the advance plane, as it had a speed of 10 to 15 miles an hour more than the other ship. In this picture a few scattered houses can be seen far below, the main group being almost directly in line with the left wheel of the plane. In the more outlying parts of the country an hour or more would frequently pass without any signs of habitation.

countered some fog, but got through without much trouble.

FLYING TO SEATTLE UNDER DIFFICULTIES

The Spokane program went off smoothly. We regretted that we could not stay for the National Air Races, but our schedule was fixed.

The flight to Seattle was more difficult. Clouds hung very low over the mountains, filling most of the passes. Colonel Lindbergh had to climb up over them to pass the range. On the other side he found a hole through which he managed to pick up the ground again.

We were forced to detour far to the south, for we carried much less gas than the *Spirit of St. Louis*. If we had crossed the range and had been unable to find a hole in the clouds, there would not have been enough gas left to carry us back. For this reason we had to look for an open pass. Cispus Pass was the first one we could find. This took us close by Mount Adams and almost within view of Portland, our next day's stop. From this point we turned north, flying up the Columbia River.

With less than half an hour's gas left, we landed at Sand Point, Seattle. We could have landed for fuel at Portland or Tacoma, however, if we had desired.

The next day was quite as interesting, though less troublesome. We followed the Columbia River most of the way. Stern-wheelers passed beneath us, pushing log rafts. At one side of the river a huge raft waited its turn at a lumber mill. Fishermen stared up at us from small boats, as we flew down by them.

Once a cannery whistle sent us a greeting. We could not hear it because of our engine, but the white steam was easily seen. The day was warm and clear. We cruised along slowly, enjoying every moment in the air.

PORTLAND'S AIRPORT IS AN ISLAND

At Portland we landed at Swan Island airport, in the center of the Willamette

A FOREST-FIRE OBSERVATION STATION BETWEEN BUTTE, MONTANA, AND BOISE, IDAHO

The wide strip across the side of the mountain is part of a trail leading up to this isolated post. Several of these forest-fire stations were found far out in the thickest forests in the Northwest.

River. This island was selected by the city to take care of seaplanes as well as land planes.

From Portland to San Francisco was a longer flight, but the scenery made up for this. We flew over Crater Lake, a small body of water in the crater of an extinct volcano. The surface of the lake is high above the water level of the surrounding country. We climbed up to get a good glimpse of Mount Shasta, a very beautiful scene, as the day was clear and bright. Its snowcap was visible for many miles.

The Golden Gate was covered with a faint haze as we came into San Francisco. Still, we were able to get a good view of the bay and the long piers that reached out into the water. By the clock on the water-front tower we saw that we were on time (see illustration, page 40). We went on to the airport, while Colonel Lindbergh circled about the city.

Next day we took off early, as there were many things we wished to see. Among these were the Seal Rocks, the Cliff House, and a wrecked ship at the entrance to the harbor. Across the Golden Gate we saw the redwood forests and Mount Tamalpais. As we headed back toward Oakland we saw scores of ferryboats shuttling back and forth across the bay.

Once or twice we had to turn sharply to

miss flocks of sea gulls. A forced landing from a shattered propeller could have been caused by striking one of these birds.

OAKLAND IS EXPERIENCED IN HANDLING AIRPORT CROWDS

At Berkeley we came down for a closer view of the University of California. A few minutes later we landed at Oakland upon the same ground used by the trans-pacific flyers in their take-off for Hawaii.

The Oakland police had become accustomed to handling crowds during these flights. Their control on our arrival was perfect. The touch-stop program went off without any difficulty (see illustrations, pages 38 and 39).

At the end of an hour we took off again for Sacramento. Over Suisun Bay we saw a perfect formation of large birds. They seemed to be pelicans. We came down very close, expecting to see the formation break at our approach. Instead, the birds swung into an arc and began circling to the left. We began banking and followed them. Because of our higher speed, we gained very quickly. One at a time, those nearest us gave up and slipped away to one side. Three or four of the birds, however, held stubbornly to the formation, turning as rapidly as we.

HEAVY TRAFFIC SHOWS WAY TO SACRAMENTO'S AIRPORT

When we came into Sacramento we found we had neglected to get maps locating the airport. All that is necessary is to know the direction of the airport from the center of the city. With this information, a pilot can fly in that direction until he sees the field. If the direction is not known, he may fly aimlessly for a long time before he locates it.

This time there was not much trouble. Love solved the problem by watching the highways leading out of the city. One of them contained more traffic than the others, so we followed it and in a few minutes came to the airport.

From Sacramento we flew to Reno. On the way we passed over Lake Tahoe, Pyramid Lake, and Smoke Creek Desert.

The flight to Los Angeles took us over Carson City and the Yosemite National Park. We spent a little time flying over the park, with its beautiful falls and peaks, then passed along the Sierra Nevada.

Farther south we came down into Death Valley. Although we were flying at more than 100 miles per hour, the heat was quite oppressive. It must have been very uncomfortable for the few automobile tourists we saw crawling along a few hundred feet below us. Once or twice we dropped down beside them and waved. We could have landed, for the floor of the desert in several places was packed almost as hard as rock. After Death Valley, we passed over Borax Flat.

"SPIRIT OF ST. LOUIS" REACHES ITS STARTING POINT

At Los Angeles the program was completed as if by clockwork. With memories of a pleasant stay, we started the next morning for San Diego.

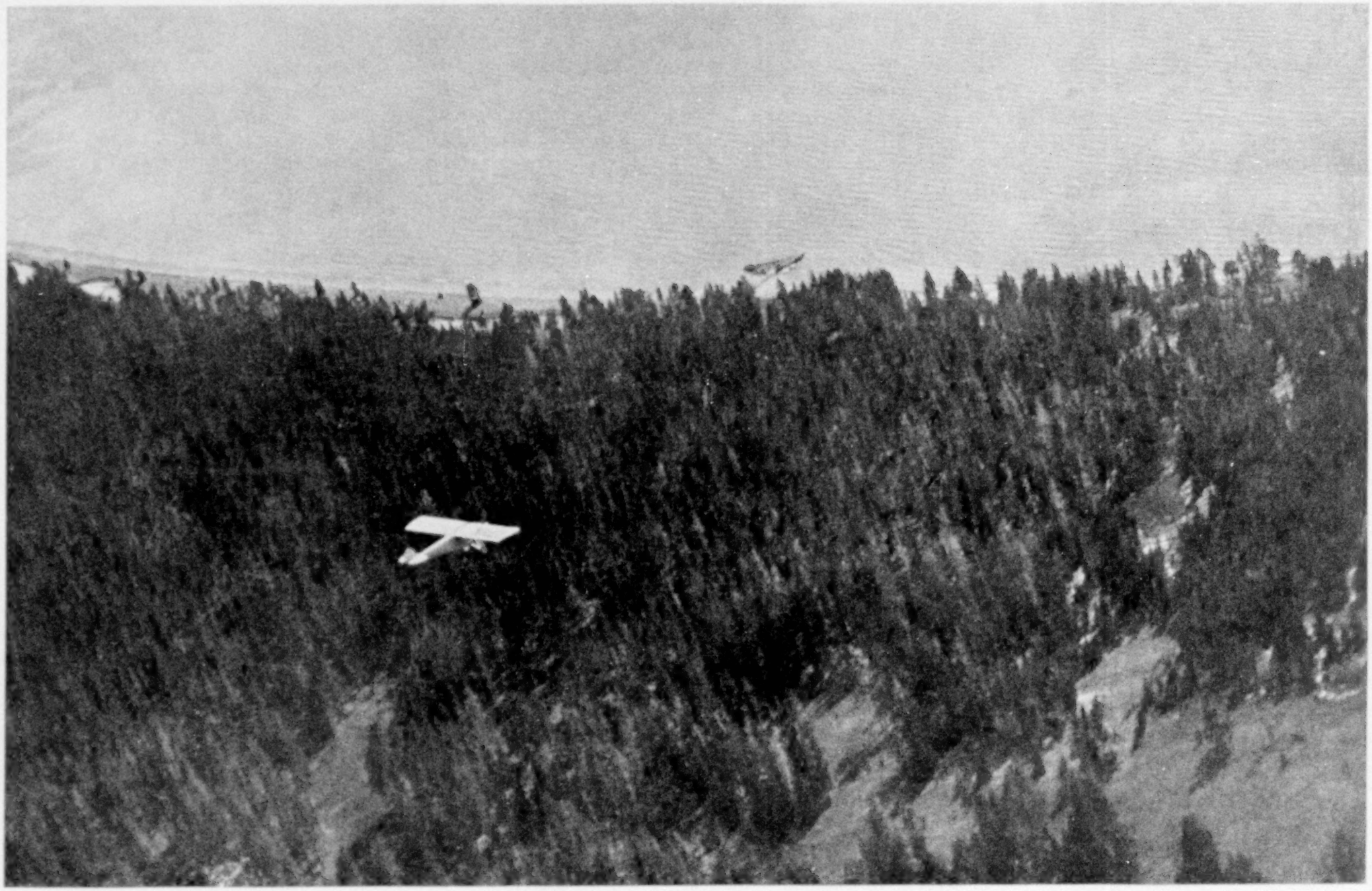
The day was clear, so we flew down the coast at a low altitude. We passed Long Beach, with its forest of oil-well derricks (see illustration, page 41). Then came groups of cottages, and open stretches where great flocks of birds covered the beach. The larger birds paid little attention to us, though a few flapped away lazily. The smaller ones hastily flew for cover.

Our visit to San Diego did not follow the usual routine. Many of the people who greeted us were the ones who waved good-bye to Colonel Lindbergh on the take-off for New York in May. The *Spirit of St. Louis* had now completed a round trip. San Diego also marked a turning point of the tour, for from here we turned back east, so that the rest seemed fairly easy.

During our two-day stop the ships were given a close inspection. Both were found to be in very good condition and ready for the last part of the tour. From San Diego we flew to Tucson, Arizona, where we met Martin Jensen, who had won second place in the Dole flight to Honolulu, then on to El Paso, after a touch stop at Lordsburg, New Mexico.

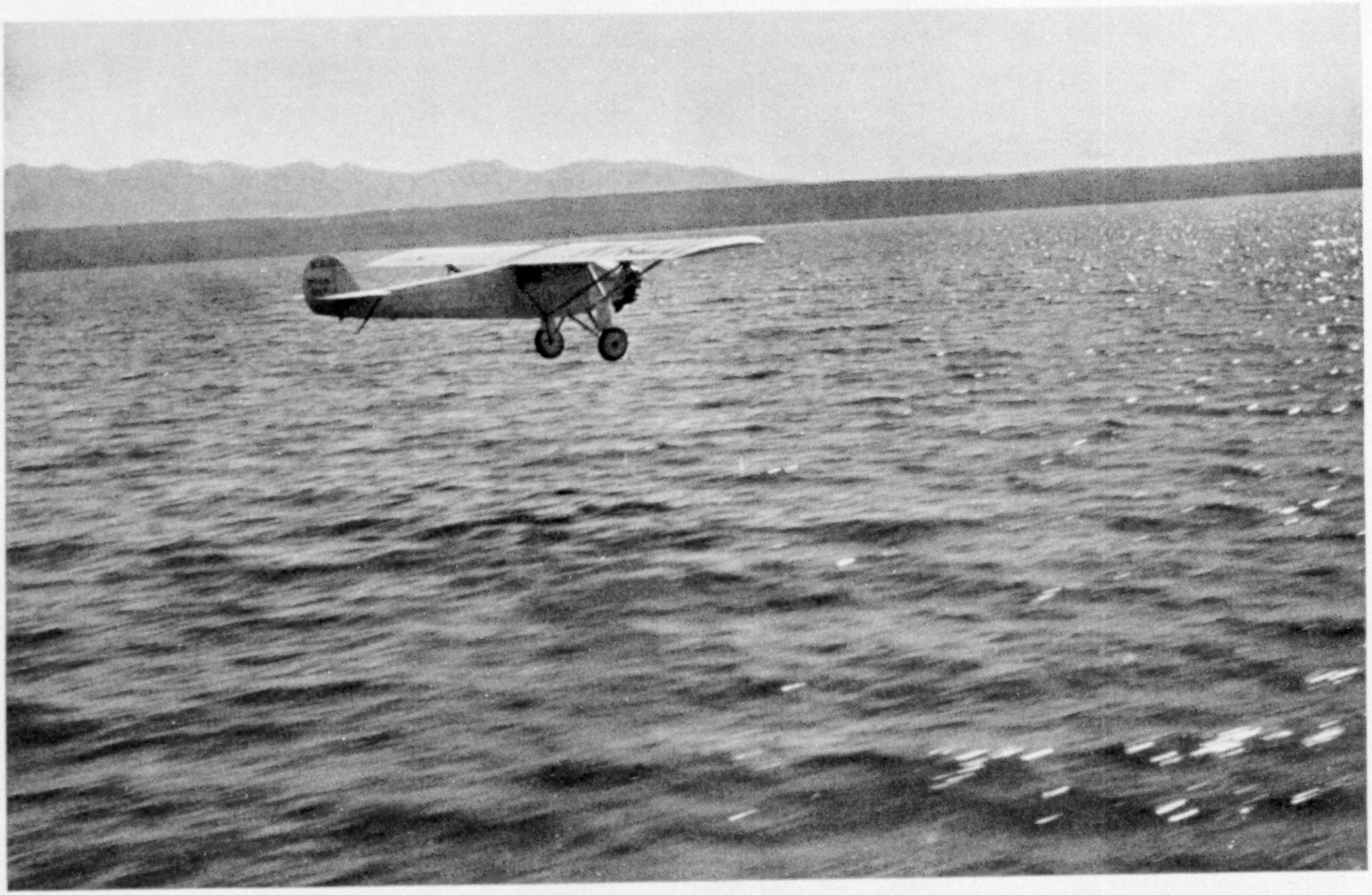
A MIDNIGHT START FOR THE HARDEST DAY'S FLYING

Before landing at El Paso we flew along the edge of the border for a glance at



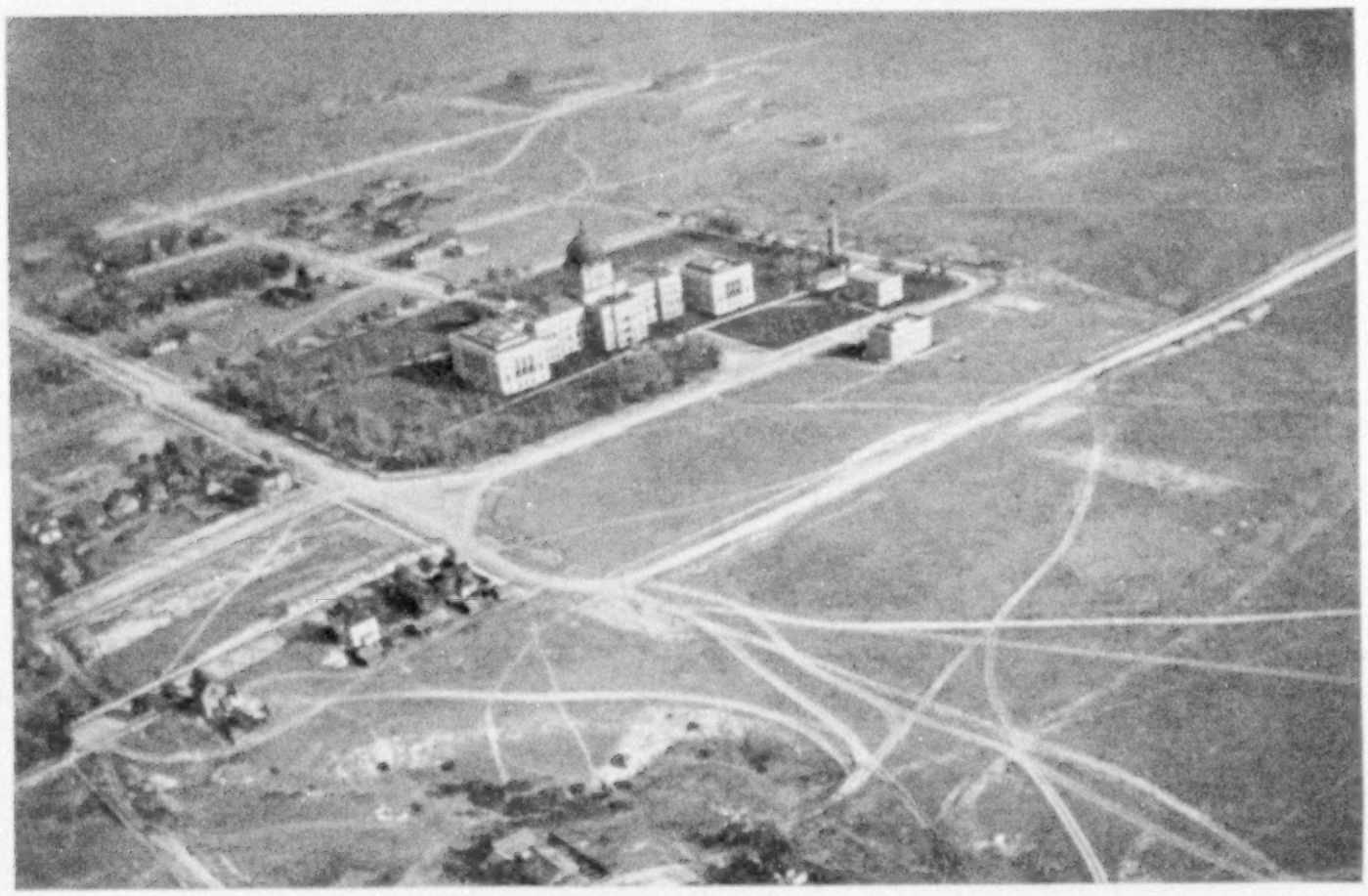
APPROACHING YELLOWSTONE LAKE

Colonel Lindbergh's plane is shown here nearing the wind-rippled Yellowstone Lake, beyond which lie Old Faithful and other geysers. By a glance at the direction of these ripples a pilot can tell instantly the angle from which the wind is blowing. This helps him to check his drift and lateral movement from the course he wishes to fly.



FLYING OVER YELLOWSTONE LAKE

Flying so close to the water would have been hazardous with the unreliable equipment in use several years ago. Pilots using the modern engines, such as that in the *Spirit of St. Louis,* have no fear in flying so low. Crossing such a small body of water could hardly be considered hazardous by the one who flew over the Atlantic Ocean.



THE STATE CAPITOL OF MONTANA, AT HELENA

One of the interesting features of this picture is the crisscrossing of the roads in the foreground, which suggests that here anyone desiring to travel in a certain direction proceeds in that way, making his own road.

Juarez and that part of Mexico which lies below the Rio Grande at this point.

Our next day took us to Santa Fé. This is a very picturesque city and one which appears even more beautiful from the air. The program here was purposely shortened, for the hardest day of the tour lay before us. We turned in at about 6:30, leaving a call for fifteen minutes after midnight. We ate breakfast at 1 o'clock and an hour later were on our way to the airport.

The engines were started with the aid of flashlights. An automobile was stationed at the far end of the field with its lights at right angles to the runway. Other cars were lined up, so that their lights pointed in the direction of taking off. Colonel Lindbergh left the ground first and we came close behind.

We found no trouble in flying after we had cleared the field. The sky was free from clouds and the stars gave some light. At regular intervals Colonel Lindbergh swung his flashlight in a wide circle to show where he was; otherwise, flying along in the dark, we might possibly have run into him. We had not expected to do any night flying and had not equipped the *Spirit of St. Louis* with navigation lights.

We had expected to watch the sunrise, but before dawn several cloud layers came between us and the earth. There was no sight of Colonel Lindbergh at daylight.

We could not get down through the clouds for two hours, as we were unable to find any break in the last layer. It would have been unwise to fly down blindly, for we might have struck a mountain before we could see it. When we did find a hole we learned we were some distance from our course, but by opening up the engine we reached Abilene in a short time.

From Abilene we went on to Fort Worth, then Dallas and Oklahoma City.

From here the tour went rapidly. At Tulsa we met Arthur C. Goebel, winner of the first prize in the Dole San Francisco-to-Honolulu flight. At Little Rock we were very sorry to hear of the death of the Governor of Tennessee. We canceled our visit to Nashville and added an extra day at Memphis.

THE CAPITOL BUILDING OF WASHINGTON STATE

Olympia was one of the 192 cities over which Colonel Lindbergh circled during his nation-wide tour. At the extreme right of the photograph, on the lawn between the two buildings, may be seen a large group of school children, who gathered at this point to watch the *Spirit of St. Louis* fly over. Here, as in each of the other cities, Colonel Lindbergh spent five or ten minutes flying low enough to give everybody a chance to view his famous plane. Even these fleeting visits had a very desirable effect, for in some cases airports were established as a result of the enthusiasm aroused in this way. A substantial increase in air mail for many of these cities was also noticed by the Post Office Department.

On our way to Chattanooga we flew over Muscle Shoals and obtained some pictures of the Government nitrate project (see illustration, page 46).

Another rest day awaited us at Birmingham, and we were feeling much better than at the middle of the tour, when we took off for Jackson, Mississippi, where three Navy planes from Pensacola took part in the day's program.

When we reached Lake Ponchartrain we ran into a heavy storm and had to detour for several miles. A driving rain was falling as we passed over New Orleans, though it had not reached the airport.

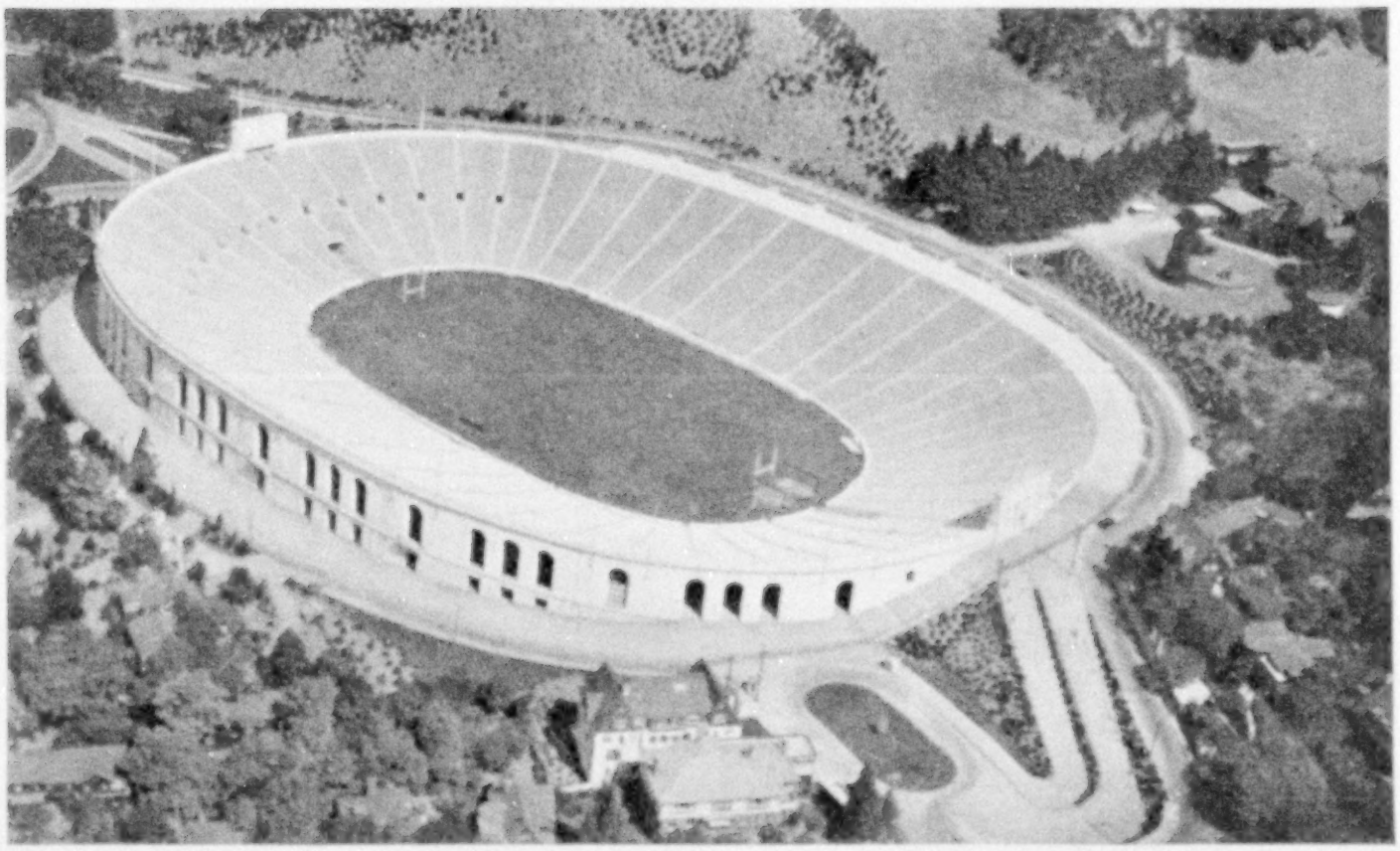
It was still raining when we reached the city, so that the reception committee had raised the top of Colonel Lindbergh's car. The parade had hardly begun, however, when we noticed that the people along the streets could not see the guest of honor. With no thought of his own discomfort, he requested that the top be lowered, after which he climbed up on the back seat. Seeing that the public had spent hours waiting for him in the rain, he thought it only fair to show his appreciation for such interest.

Rain pursued us to Jacksonville, Florida, our next stop.

PILOT VISITS SPOT WHERE HE HAD CRASHED

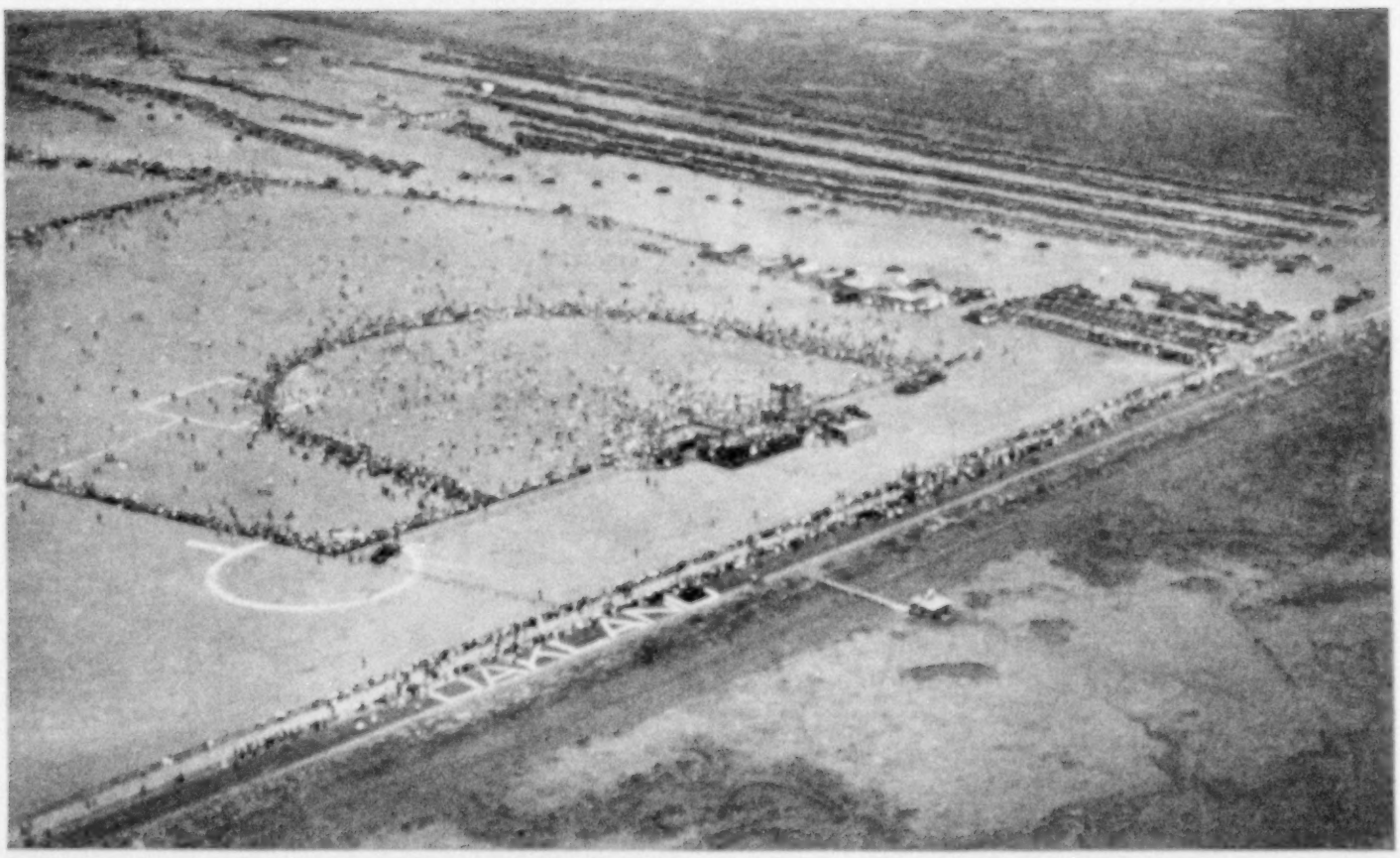
The rest of the tour was almost a direct flight north. On the way to Atlanta we flew over the spot where Love had crashed in 1925, while flying over cotton fields and dropping an arsenic dust preparation to kill the boll weevil.

During the time he was working in this way he contracted a case of slow arsenic



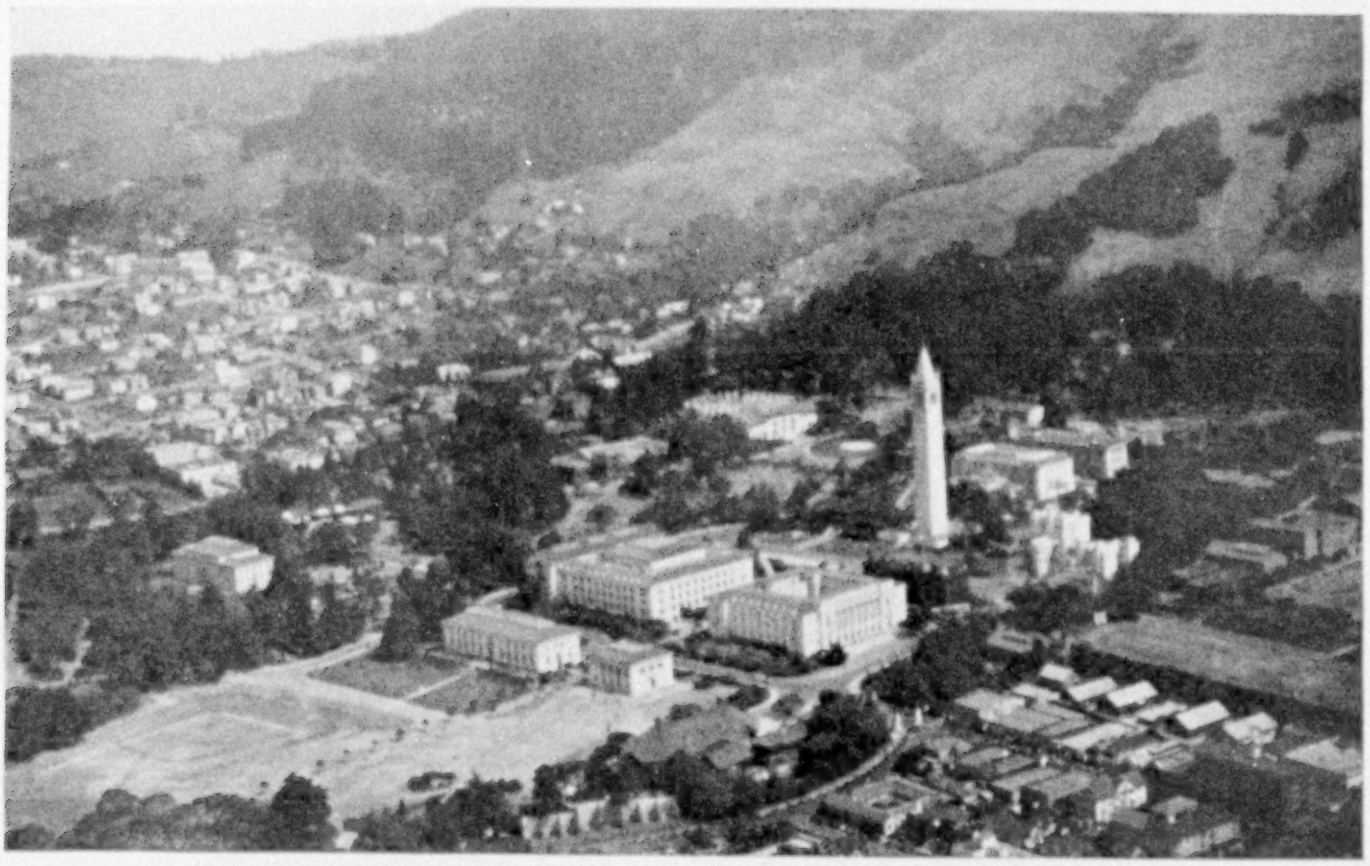
THE UNIVERSITY OF CALIFORNIA STADIUM AT BERKELEY

This brief side flight was made on the spur of the moment, when the tour party decided to do a little sightseeing.



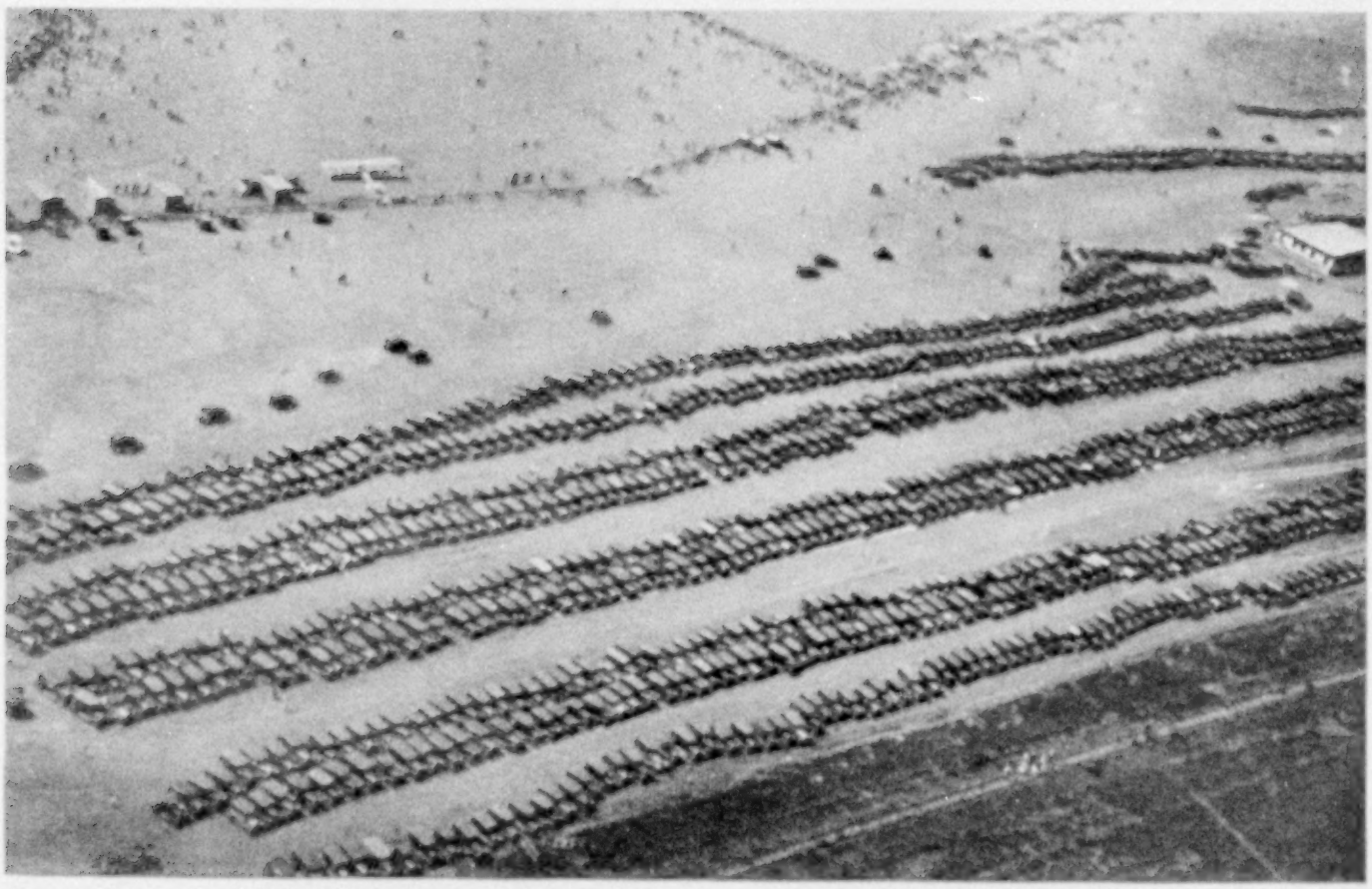
A GLIMPSE OF THE CROWD AT OAKLAND (SEE, ALSO, PAGE 39)

This modern airport when completed will cover 825 acres and will be one of the largest in the world. At present it has one runway 7,000 feet long and 250 feet wide. There is also a square area, part of which is here shown, now ready for use. This is 1,700 by 2,500 feet. The white circle and the name "Oakland" are made permanent by the use of crushed stone. These markings are a very great help to the airman who is flying cross-country over strange territory. Hangars, night lighting equipment, and other apparatus are being installed.



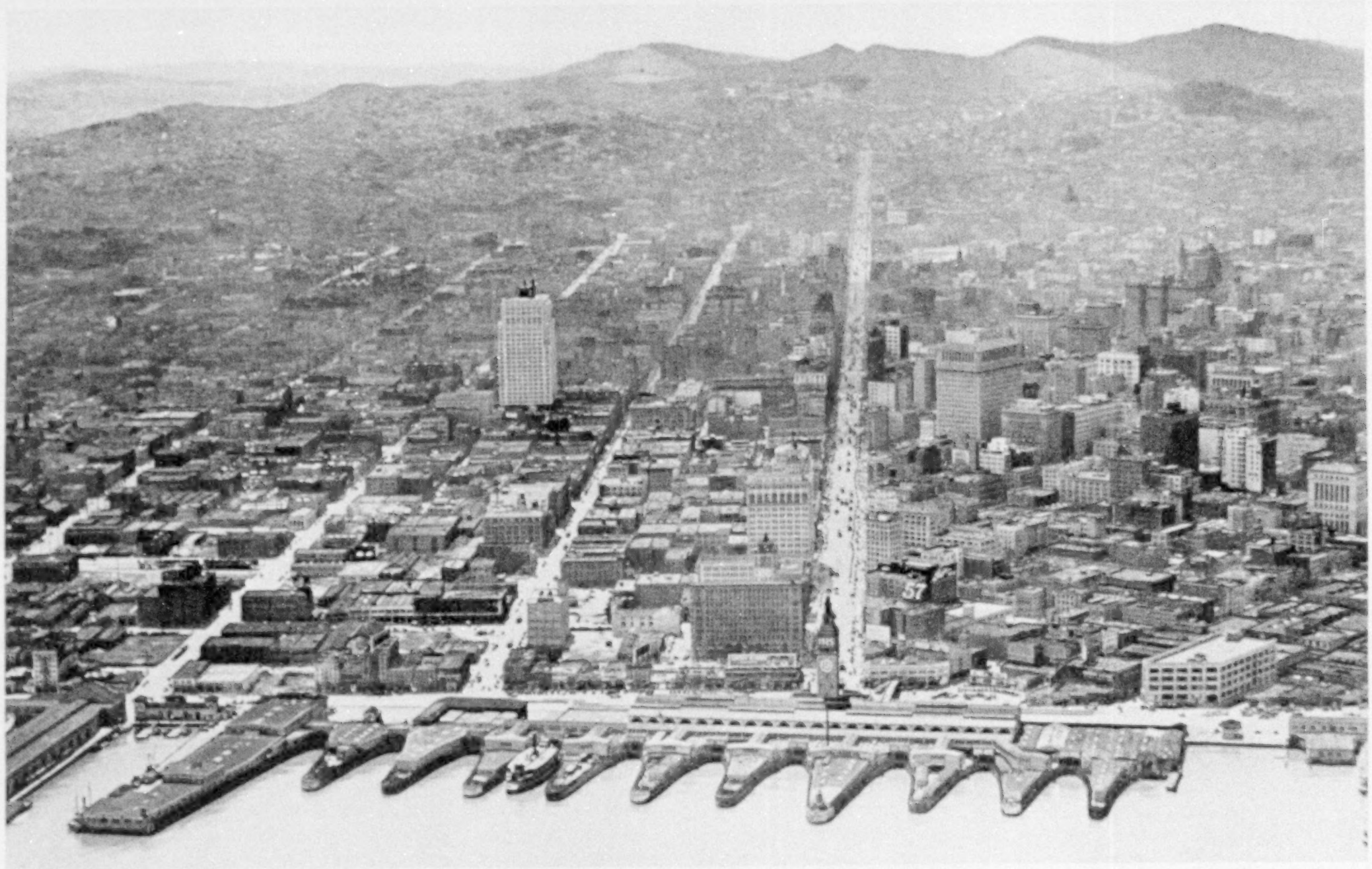
ANOTHER GLIMPSE OF BERKELEY

Heading toward the hills in the valley of which lies the city of Berkeley, the tour party flew low over these University of California buildings.



AUTOMOBILES PARKED AT THE OAKLAND AIRPORT

These are only a portion of the vast number of automobiles parked at one side of the airport at Oakland, where a temporary stop was made. This was the airport used by the trans-pacific flyers in taking off for Honolulu, and is a recent development. It did not exist at the time of the Byrd Plane Tour of the preceding year, when Floyd Bennett flew across the United States. This is an indication of the rapidity with which cities are acquiring modern airports and preparing for this new system of transportation.



Photograph from Californians, Inc.

THE SAN FRANCISCO WATER FRONT FROM THE AIR

The clock in the tower along the row of piers is the one by which Colonel Lindbergh found that he was on time in arriving at the Golden Gate. Even at this hour, long before he was due to parade up Market Street, this famous thoroughfare was black with seething masses of humanity, while hundreds of policemen strove to keep a passageway clear for the procession when it should arrive.

A FOREST OF OIL-WELL TOWERS AT LONG BEACH, CALIFORNIA

Thick as trees in a forest are these derricks along the California coast at Long Beach. This point was passed by the aviators on the way from Los Angeles to San Diego. The day was fine, so that there was no danger in flying low out over the beach and watching the ever-changing scenes along the shores of the Golden State.

INDIANS INSPECTING THE "SPIRIT OF ST. LOUIS" AT TULSA

Inclosures were erected at almost every stopping place where there were no hangars or where, as in this case, the city wished to leave the ship on display. A strong barrier was necessary to keep the plane from being demolished by pressure of the eager crowds. Another reason for these inclosures was to keep away the vast number of people who forgot that Colonel Lindbergh could not possibly shake hands with each one or give an autograph to all of those who requested these souvenirs of his visit.

poisoning. One day, while flying at the low altitude which this work requires, he became unconscious and crashed. The spot where the plane struck the ground was still visible when we flew over and Love circled around it for 10 minutes, explaining just how it had happened. Precautions are now taken against poisoning in work of this kind.

ROUGHEST AIR OF TOUR ENCOUNTERED BESIDE STONE MOUNTAIN

Atlanta was the next stop. As we left on the following day for Spartanburg we flew by Stone Mountain, on the side of which the Confederate Memorial is being carved. We had a very close view of the men working on the side of the mountain, and of the outlines of the memorial. At this place we experienced the roughest air encountered during the tour, caused by the air currents descending the side of the cliff.

Just before we left the mountain, we flew over the top of it and were surprised to note the same sensation usually experienced in looking over the edge of a high building. None of us had ever felt this before while flying, although many people believe the feeling to be a part of flying. We decided it was caused by our looking down over the edge and seeing the cliff pass suddenly beneath us only a few feet away.

In order to accommodate the large number of people who wished to attend the banquet, the committee at Spartanburg secured the dining room of Converse College. The girl students had been glad to offer their dining room for Colonel Lindbergh, even though it meant that they had to content themselves with a "bag supper" in their rooms. The only condition which they made was that Colonel Lindbergh on his way to the dining room should walk down a lane formed by all the fair students.

I neglected to explain this proviso to him until he was entering the hall of the building, and for a moment I thought he was going to make a hasty retreat. However, followed closely by the rest of the party, he hurriedly walked the gauntlet of a thousand admiring feminine eyes.

Atlanta and Spartanburg, like the next five cities visited, are to be stopping points on the air-mail route from New York to Atlanta. After March 1 fast mail planes will be flying back and forth at night over the completely lighted airway connecting these cities. Good airports have already been established at most of these places.

A touch stop was made at Greensboro before reaching Winston-Salem. The city of High Point joined with the others of the Tri-Cities in a general program at Winston-Salem. Here we added Kusterer to our party in the advance plane. He had finished all his work and had come back to see how we followed his plans.

At Richmond we were met by Mr. Guggenheim, who had come down from New York to witness a day's program. During the week-end at this city Colonel Lindbergh took Governor Byrd and Mr. Guggenheim for a flight in the *Spirit of St. Louis*.

An unannounced visit was made at Washington on Monday, and on Tuesday we left for Baltimore. There was a very low "ceiling" and it was raining heavily in spots, but we made the short flight with only a few detours.

THE LAST "OFFICIAL" DAY

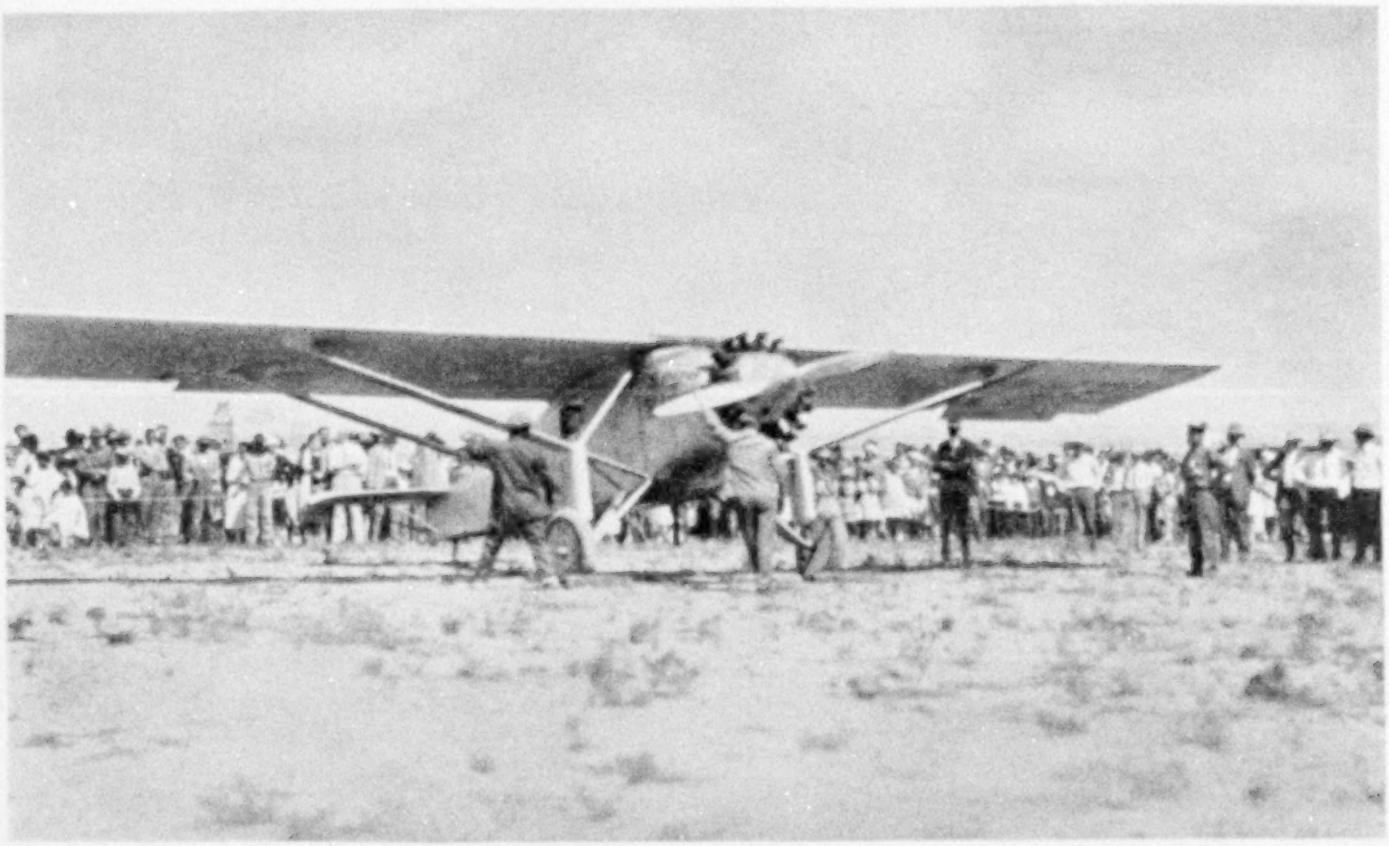
From Baltimore to Atlantic City was another flight under gray skies. On this trip the advance plane carried Clarence M. Young, Director of the Aëronautics Branch, Department of Commerce, as a passenger.

Flying back across the Delaware, we landed at Wilmington with but one more stop before the end. The last city was Philadelphia, where every detail was well carried out. The last "official" day ended satisfactorily for all of us.

We had expected that the tour would be somewhat of a strain, especially near the end, for we were averaging more time than air-mail pilots during the same period. However, the nicety with which the many details of the program were carried out by the cities pleasantly surprised us, and we ended the journey feeling better than at the halfway point.

Along the entire route the greatest credit should be given those in charge of policing at airports, handling of parades, arranging banquets, and making explanations to the countless hundreds who insisted on personal interviews with Colonel Lindbergh.

So efficient was the policing at some places that some members of the party



"PULLING THROUGH" THE PROPELLER

C. C. Maidment, mechanic on the tour, is shown about to "pull through" the propeller on the *Spirit of St. Louis.* This ship does not have a starter, as this would have meant much more weight during the transatlantic flight. Many modern planes are equipped with starters. At many of the touch stops the assembled crowds surpassed the population of the town, as throngs of people came from remote sections, many of them starting the day before, to catch a glimpse of Colonel Lindbergh, even though he was to remain but a few minutes at the airport.

had difficulty in identifying themselves. At Philadelphia this was well illustrated. Phil Love accidentally became separated from the rest of the party near the speaker's stand at the Sesquicentennial Stadium. Kusterer and I, on the stand, caught sight of his arguing with a giant of a policeman who even refused to look at his card.

We held a little conference and decided to see if Love's powers of persuasion would prove effective. When we last saw him he was still engaged in a heated argument and did not seem to have much success.

Half an hour after we reached the hotel one of the plain-clothes men at the door to our suite came in rather disturbed. "There is a red-headed fellow out here that acts pretty mad," he told us. "We started to put him out, but we wanted to be sure we were right. Would you mind taking a look at him?"

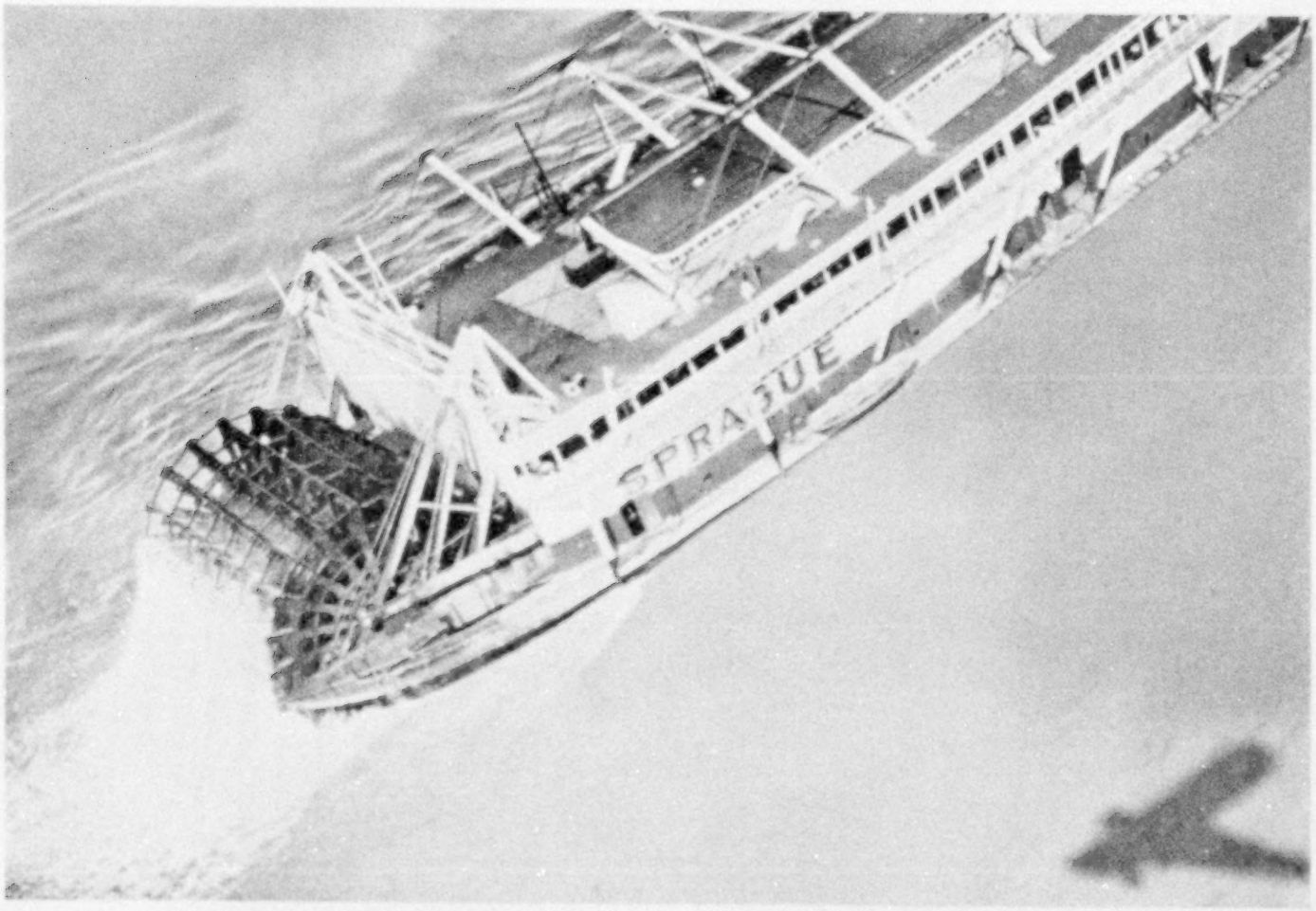
Kusterer and I went out and found our pilot in a very aggrieved state. We were strongly tempted to tell the policeman that we had never seen him before, but realizing that we had one more flight to make with him, we decided it was safer to let him in.

RELIABILITY AND PUNCTUALITY OF AIRPLANES PROVED

Now that the end of the tour was at hand, we did not know whether to be glad or sorry.

Soon we were in the air for the last flight, and in a little while were over Mitchel Field, slipping down for a landing. We taxied into a space at one side. A few minutes later the wheels of the *Spirit of St. Louis* rested on the hangar floor they had left more than three months previously.

The United States Tour was over. We had proved what we set out to do—that modern airplanes with present-day engines can keep to regular schedules as successfully as railroad trains. Some of the facts of the tour bear out this statement. We had no mechanical trouble of any kind. With one exception, we kept to the

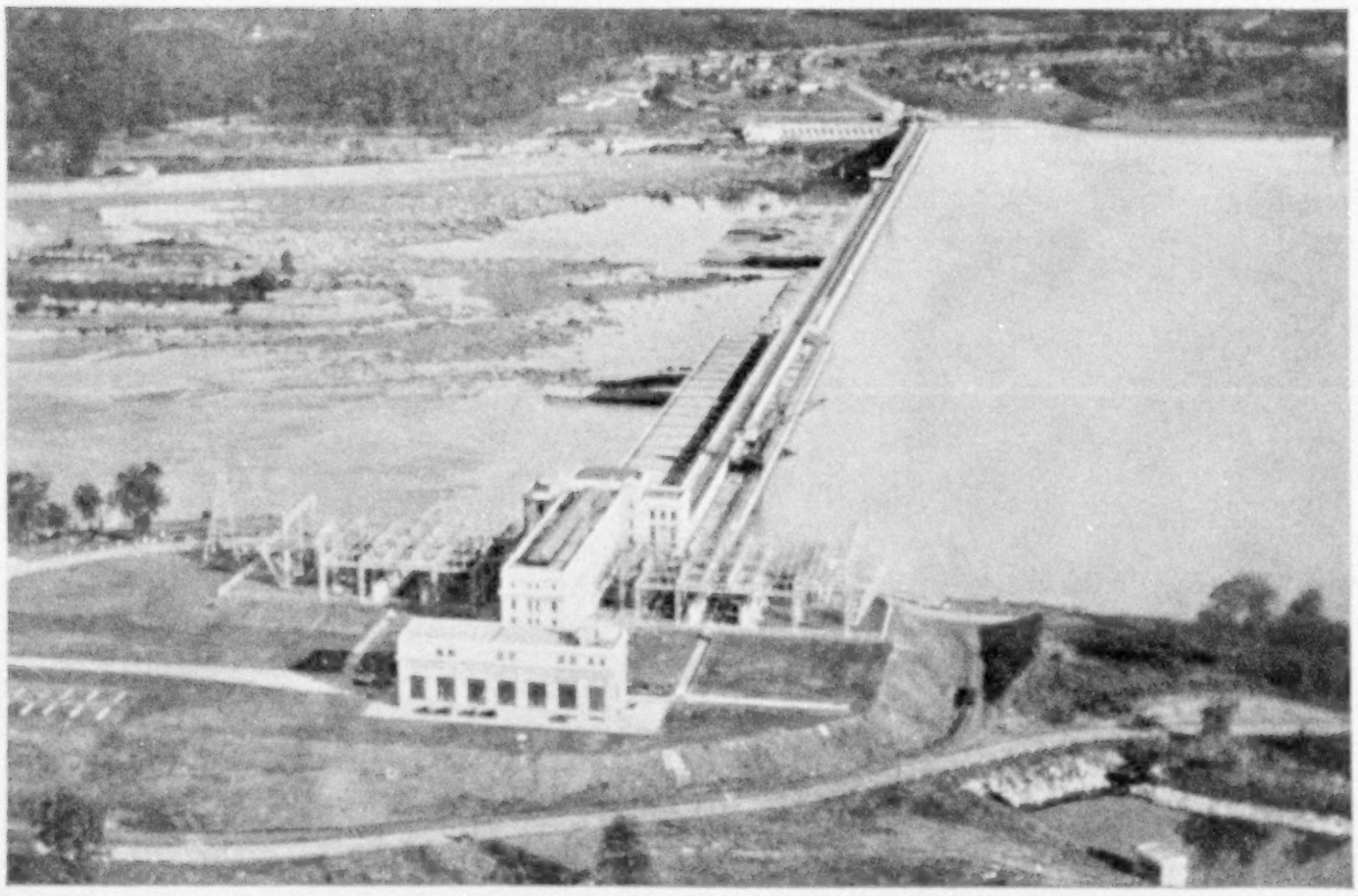


THE OLD WAY TO TRAVEL AND THE NEW

In the lower right corner of the photograph is the shadow of the advance plane, from which this picture was taken. The steamer *Sprague* was headed up the Mississippi, toward Memphis. After circling the steamer for several minutes, the advance plane straightened out toward Memphis, where it arrived within 20 minutes. It took the steamer four hours to cover the distance.

PART OF THE FLOODED AREA BELOW MEMPHIS

Dropping down the Mississippi, both planes flew along the banks to look over the recently devastated areas. This was one of the places where the flood waters had not receded. The steamer *W. M. Rees* is pushing heavily loaded barges upstream.



AN UNUSUAL GLIMPSE OF THE WILSON DAM AT MUSCLE SHOALS

The airplane offers many advantages to the engineer, or to anyone wishing to get a complete picture of such a large project as this. Aërial mapping, surveying, and photography are already extensively used in many parts of the country. The planning of parks, laying out of new streets, and improvement of civic architecture are facilitated by means of the airplane.

schedule made out before the tour began. The exception was at Portland, Maine (see text, page 7), which has been explained. Weather conditions were normal during the tour. We flew through fog, rain, snow and darkness as well as in clear weather.

The total mileage covered by the *Spirit of St. Louis* was 22,350 miles. The advance plane flew 20,350 miles. This difference was caused by Colonel Lindbergh flying half an hour more each day to allow the advance plane to arrive ahead.

The entire trip was made in 260 flying hours, or the equivalent of eleven days. The accompanying map (page 5) does not show where all of this mileage was obtained, for we seldom flew a straight course. On 192 occasions we zigzagged between stops to circle cities and drop messages. Other detours were for sightseeing.

One fact impressed on us during the three months was the great advantage of the airplane over other forms of transportation, especially in mountain country. Here the automobile and the railroad train must wind back and forth in order to negotiate the grades, or deviate to find passes. The airplane simply climbs up and flies across in a straight line. It needs no bridge to cross a river; it needs no road to get by a thick forest.

All these things make the airplane a most natural means of transportation in mountainous and isolated parts of the country. It is, of course, a great time-saver everywhere, but it should be of special value in our larger, more sparsely settled States.

Some day air tourists will follow many of the invisible air trails along which Colonel Lindbergh passed in his nation-wide tour. They will look down upon the garden spots of America from comfortable air transports in which they will travel with the same feeling of safety as in railroad trains.

To such travelers alone will come the fullest appreciation of this beautiful country of ours. Only from the air can one attain to a complete realization of the vastness of the continent, of its ever-changing panorama, and of its thousands of beautiful scenes.

DALMATIAN DAYS

Coasting Along Debatable Shores Where Latin and Slav Meet

By Melville Chater

Author of "Across the Midi in a Canoe," "History's Greatest Trek," "The Shores of Sunrise," etc., etc., in the National Geographic Magazine

"MY PLAN," he explained, opening a map on the drop-table in our railway compartment, "is to do Yugoslavia's western frontier from the Alps to Albania. I'll take off among snow peaks, descend to the Adriatic, coast along Dalmatia, and end atop Montenegro's mountains."

We had become acquaintances on the eastbound Orient Express. He proved to be a retired United States consul, now traveling for pleasure, or, as he jokingly put it, on acquired momentum. He spoke innumerable tongues, including a dash of Romany, and his mind was a storehouse of knowledge, picked up in the big capitals and queer corners of the world.

How many traveling Americans really know the United States consul and his works? In real life, as distinct from "Madame Butterfly," he doesn't waste much time in adjusting naval officers' love affairs, and your little matter of a passport visa or of lost baggage is but a detail of his office day.

He is ever at his task of preparing economic reports which, percolating through business or journalistic channels, assist in interpreting some foreign country to the American people. To this end he has, at times, contributed veritable books, entailing years of patient research in preparation, to the archives of the American Consular Service.

WHERE AUSTRIA, ITALY, AND YUGOSLAVIA MEET

Such are some of his multifarious works, performed under the insignia of the Eagle and the Arrows, that emblem which greets many an American in many an outlandish spot, with its warming touch of home.

Having somewhat similar plans in mind, the ex-consul and I ended by adopting each other, on the basis of his itinerary, as fellow travelers.

We made the necessary rail connection in that magnificent Alpine territory where the borders of three states meet. Slowly our train wound through a wild gorge whose green, ribbonlike rivulets thrashed their way in and out of tempting trout pools en route to the Sava. Such is the Slovenian pass which thrusts itself wedgelike between Italy and Austria or, conversely, opens funnellike into Yugoslavia (see map, page 50).

Local humorists affirm that Italian and Austrian loggers, perched on the gorge's opposite crests, have been known to yell across Yugoslavia, "How's the grub in your camp?" But Paul Bunyan, mythical colossus among North American lumberjacks and past master in the gentle art of exaggeration, would probably have drawled his yarn thus: "I washed my shirt and hung it out across Yugoslavia to dry, so's the sleeves flopped down into Austria and the tail hung over into Italy."

The Slovenian valley, where nestles Yugoslavia's frontier village of Kranjska Gora, measures at that point, from one mountain boundary to the other, scarcely five miles. Yet what a five-mile stretch of Alpine sward, lying like some great turquoise cup whose sheer sides are crowned, as Roman wine cups were crowned, with snow!

Here tiny Kranjska Gora huddles under the drifted Razor whose great, sky-cutting blade rivals the Moslem's fabled scimitar bridge to Paradise.

One doesn't bother about names at Kranjska Gora. Either you sleep at "the inn" or else at "the other inn." And there are no street names, because nobody would know what to do with them. A house number is all the address that any one of the 750 villagers needs, and that of

Photograph by Melville Chater

BENEATH THE APPLE BLOSSOMS OF KRANJSKA GORA

This tiny frontier village of Yugoslavia nestles in the valley of the Sava, at this point a five-mile stretch of Alpine sward between the Karawanken and Julian Alps. It is a center for mountain climbing and skiing.

"Kranjska Gora 150" will remain the numerical limit until the next bridegroom builds "Kranjska Gora 151" for his bride.

It was Maytime — Alpine Maytime. The apple trees bent under their blossom-drifts and the dandelion was already a puffball. The dried-up river bed revealed prone tree skeletons, the work of last autumn's torrents. The skiing ground was a lush pasture, and the skiers had trekked to surrounding mountain tops, where light snows were still falling.

CROSSING CROATIA'S MOUNTAINS

Following the gray-green Sava, arush over pebbly bottoms, and with the Karawanken's grotesque profiles sinking away where farmland revealed red-petticoated women in the furrows, we continued eastward to Zagreb; then turned westward toward Fiume. This sharp detour crossed the panorama of Croatia's magnificently forested mountain country as our train climbed to the regional watershed before descending to the Adriatic.

A REGION OF JACK-IN-THE-BOX RIVERS

The route held its surprises. Imagine a mountain town halved by a rushing river which plunges forty yards into a crevasse under the sidewalk, and then, three miles farther on, pops up unexpectedly, to resume its surface course. Yet such fluvial feats characterize not only Croatia, but the entirety of those barren highlands which extend southward behind the Yugoslav coast.

They form the so-called Karst region, which geologists have compared to a vast petrified sponge. Such are the tricks that time and rushing streams have played with the Karst's easily decomposed limestone. "Now you see us and now you don't!" gurgle in chorus a whole system of such jack-in-the-box rivers, as they plunge into the mountains' eastern flank,

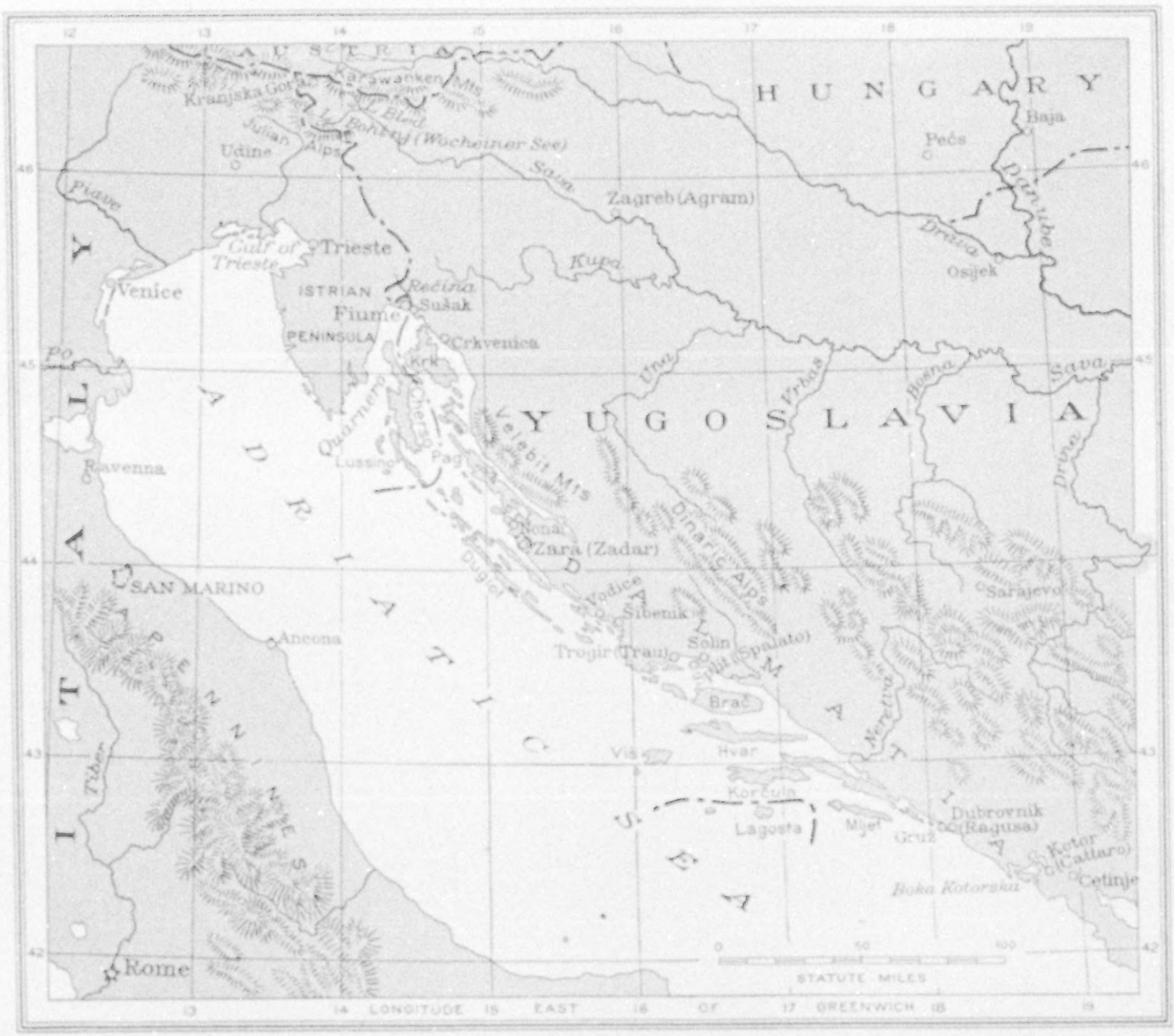
LAKE BLED PROVIDES THE SETTING FOR A MINIATURE OF DREAMLIKE BEAUTY

The pilgrimage church and crag-topping castle reflect their profiles in still, blue waters which lie between the snow peaks of the Karawanken and the Julian Alps.

Photographs by Melville Chater

THE OLD AND NEW DISPENSATIONS AT KRANJSKA GORA

The girl on the right has long hair, native head kerchief, and the useful broom. The "flapper" on the left has bobbed hair, skirt at half-mast, swagger cane, and vanity box.



Drawn by A. H. Bumstead

A MAP OF THE DALMATIAN COAST

So indented is the eastern shoreline of the Adriatic that its sinuosities measure three times the airline distance from Trieste to Kotor. On this coast Eastern and Western culture meet. The author's "Dalmatian Days" were spent in a leisurely journey, traveling by rail and water from the northwestern tip of the Serb, Croat, Slovene State (Yugoslavia) at Kranjska Gora to Cetinje, capital of the former kingdom of Montenegro.

triumphantly reissuing, scores of miles westward, as feeders of estuaries or, in one case, as a fresh-water spring emerging from sea bottom.

Had some Marco Polo left us an account of the marvelous Land of Spongy Mountains, whose rivers cut through the bases of ranges 1,000 feet high, we might have dismissed him as a fabulist; yet in sober fact a Montenegrin river has performed that identical feat.

WHERE FARMS ARE HOLES IN THE ROCK

While descending through the indescribably sterile-looking Karst, I turned to my companion: "Why, in this desert, build those innumerable, circular stone walls to inclose at most a bit of grass? It seems hardly worth while."

"Don't worry!" he laughed. "Man never labors unnecessarily. What you see are karst-holes—extremely rich oases. I once wrote a report on karst-hole farming." And he explained how, in that land of jack-in-the-box rivers, natural precipitation, instead of draining into streams, sinks through the porous stone, carrying vegetable matter along with it, and enriches a regional series of funnellike ditches. Thus, "farming in holes"—the karst-holes, which sometimes number several hundred within a small area—provides grain for the inhabitants of this mountain-side desert.

Photograph by Hans Hildenbrand

BEANS FOR HER BASKET

Zagreb's market, lasting from early morning until about noon, is held in the heart of the Croatian capital, in Jelačić Square, named for the hero of the Croat revolution against Hungary in 1848 (see, also, Color Plate IX). At evening, after all the country folk have departed, the citizens invade the square and seat themselves at small tables outside the coffee shops.

The blinding, sizzling Karst came to a spectacular end when we espied, from nearly half a mile above, what appeared as a gigantic relief map, the Istrian mountains curving around the Gulf of Quarnero, and to southward the Velebit Mountains' outflung ridge spanning the rim of illimitable Adriatic blue.

A RIVER REPRESENTS THE HYPHEN IN FIUME-SUŠAK

"My recollection of Fiume," observed the ex-consul, as we drove to our hotel, "is that its front doors are on the sea and its back doors are among the mountains."

Any prospective visitor to Fiume who may question that picturesque statement is hereby invited to climb up 425 certain steep steps, taking them in cool weather and "on low." He will find himself among the city's back doors, overlooking the Velebit ridge. A turn about will give him an airman's view of the terraced hillside by which Fiume-Sušak descends to its far-stretched curve of wharfage; and from one's feet there plunges headlong the mere ribbon of water that divides what is practically one city into two ports, Fiume and Sušak—the former in Italy, the latter in Yugoslavia.

Probably no narrower stream than the Rečina ever demarked so important a frontier. Its little, internationalized bridge, which is aptly symbolized by the hyphen in "Fiume-Sušak," can be crossed in one minute. You may dine in Italy and take strolls in Yugoslavia between the courses. A baseball battery warming up across the Rečina, with the pitcher in Yugoslavia and the catcher in Italy, would be spaced approximately at the regulation distance.

DALMATIA'S INDENTED SHORE LINE TRIPLES ITS LENGTH

We bought and tussled with a map of the Yugoslav coast. It gave us that hopeless feeling which possibly overcame the first explorer who attempted to chart Maine's coast line. Also, we sympathized with that other explorer, who, weary of counting islands in the St. Lawrence, probably said, "Oh, let's name 'em the

Photograph by Hans Hildenbrand

A RELIGIOUS PROCESSION NEAR ZAGREB

The simple piety of Yugoslav peasants is revealed wherever a rustic shrine awaits the burdened wayfarer. From above pine-dark precipice or foaming torrent, from beside tilled field and peaceful pasture, it looms up—the lonely figure of the Crucified, with thorn-crowned head and flower-bestrewn feet, with gaunt body flecked with white among the snowlike flurries of apple blossoms.

Thousand Islands and call it a day's work!"

Even Maine's shores are rivaled in their zigzag conformation by those of Dalmatia. While a direct course along the Yugoslav littoral measures 300 sea miles, the indented length of that coast is almost three times as long. As for the man-sized job of counting Dalmatia's islands, that has been simplified by ignoring insignificant islets and putting the archipelago's units at 600 and its area at 2,000 square miles.

A CLEAN SWEEP OF AUSTRO-HUNGARIAN PLACE NAMES

Our map presented other difficulties. The Kingdom of the Serbs, Croats and Slovenes (Yugoslavia) has made a clean sweep of former Austro-Hungarian place names in favor of their Slav equivalents.* Like the out-of-luck American tourist who wouldn't stop off at "Praha" because he wanted to get on to Prague, we often needed a bilingual key to ascertain where we were. So we compiled a list of Yugoslav place names, bracketing their prewar equivalents, as follows: Lake Bled (Veldeser See), Lake Bohinj (Wocheiner See), Zagreb (Agram), Zadar (Zara), Šibenik (Sebenico), Trogir (Trau), Solin (Salona), Split (Spalato), Gruž (Gravosa), Dubrovnik (Ragusa), Kotor (Cattaro).

As neither railroad nor motor trail spans the Yugoslav coast, we took that oldest and most appropriate of routes, the sea lane, to rediscover those shores whose maritime fame antedated England's by centuries. From among luxurious liners more modest steamers, and fleets of sailing craft, one may choose one's traveling style along what is one of the best-served littorals in south European waters.

As Sušak fell astern, Italy disappeared behind islands, to remain invisible throughout our entire voyage. With an archipelago barring the open sea and with the Velebit's barren heights rising behind the narrow coast, it seemed as if we were navigating a succession of blue, flawlessly calm lagoons.

"Good-bye, Europe!" said the ex-consul, waving a hand toward Italy. He added, "Small wonder that, with mountains barring the east and an archipelago barring the west, Dalmatia has always been a debatable land or halfway house, where racially speaking, Europe and Asia meet."*

Certainly, the more one sees of Dalmatia, the more one feels himself to be, while not exactly out of Europe, yet somehow among the fringes of the Orient.

I recalled that this "debatable land" had once been disputed by Rome's eastern and western empires; that Islam's armies were here confronted by Christianity's outposts; that here had been the meeting ground of Latin and Slav; that to-day Dalmatia is still the borderland of the Catholic and the Greek Orthodox faiths.

Now and then we touched port in some deep-set bay with its hill-perched townlet—often an almost streetless clump of vine-clad houses—which had dug its heels into the Velebit and held on while as yet Venice was unheard of. Yet the specter of the lagoon republic, medieval Dalmatia's protectress, still haunts every nook and corner of the Yugoslav coast.

Once we even found a bit of junked antiquity mortared into a peasant's house wall. It was a big carving of St. Mark's imperious, Bible-brandishing lion which, regrettably, had been almost obliterated by successive coats of green paint. The proprietor claimed that living with that old carved lion had finally got on his nerves. He wasn't certain about green lions, but at least, he said, it was a cheery color.

A TOWN IN MOURNING FOR FIVE HUNDRED YEARS

At the pleasantly informal seaside resort of Crkvenica we were astonished to find the town in mourning. Every native woman was clothed in black, and grandmothers sat knitting things of the same funereal hue. Had the *bora*, that fearful "wind of the dead," taken toll among the local fishing fleet? We questioned a subdued, rather henpecked-looking native. Sadly he replied:

"It's for the Frankopan family. Much beloved, kicked out of the country, some of them executed. And the women have worn mourning ever since. No, they never let go, our womenfolk don't—I'm a

* See, also, "The Whirlpool of the Balkans," by George Higgins Moses in the NATIONAL GEOGRAPHIC MAGAZINE for February, 1921.

*See, also, "East of the Adriatic," by Kenneth McKenzie in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1912.

Photograph by Erdelyi

PROVIDERS OF THE WHEREWITHAL FOR A PICNIC

Dalmatia's 10,000 fishermen haul up yearly some 4,000 tons of finny wealth, three-fourths of which consists of sardines. The boats with their great colored sails form one of the most noteworthy attractions of the coast. The wind known as the *bora*, "the demon of the Adriatic," occasionally takes heavy toll from the fishing fleet.

Photograph by Melville Chater

STEERAGE PASSENGERS

Sheep are numerous in the Karst region and in isolated districts of Dalmatia. Some are bred chiefly for their milk, used in cheese-making; but most of them provide the meat mainstay of the peasants. The wool of the native animal is too coarse for the better grades of cloth, but efforts are being made to improve it.

married man myself—once they get an idea into their heads" (see page 58).

We were about to inquire whether the mourned ones were Bill, or Pete, or Mamie Frankopan, or who, when he resumed: "You'll find Frankopan castle ruins everywhere along this Croatian coast. It all happened along about the fifteenth century. Yes, they're obstinate when you cross them, our women are. Nursing a sorrow, *I'd* call it."

We were properly sympathetic, and then, trusting not to jar indecently on any Frankopan mourner's grief, we betook ourselves to Crkvenica's gayest bathing beach.

Our connecting steamer wound through the narrow, lagoonlike waters, known along the coast as "canals," which had once been ruled by those petty potentates for whom, Croatian tradition asserts, mourning weeds have become perpetuated as a national costume.

Now the Velebit range, its barren, slate-gray flanks queerly diagramed with walled karst-holes, thrust menacingly forward, barring Croatia from the Adriatic. Occasionally there appeared V-shaped valleys where some tiny, stucco port nestled among a luxuriance of trees, hedged gardens, and terraced vineyards. Such are the Velebit's always amazing oases, created by subterranean streams.

ILLYRIAN PEASANTS BECAME EMPERORS

A wild strip, this, of the ancient Illyrian coast! Wild, too, were the first Illyrians, a mixture of pre-Homeric Greeks and those wandering Asians, the Liburni, after whom Rome called the country Liburnia. Legend says that from Cadmus and Harmonia, through their son Illyrius, sprang the tribes that perpetuated his name.

Herodotus describes the Illyrians as tattooed savages, addicted to human sacrifice. Next we hear of them as redoubtable pirates, ravaging the Greek and Italian coasts. Later they became prime recruiting material for Rome's legions. And last we actually behold Illyrian peasants, in the persons of Claudius, Aurelian,

Photograph by Merl La Voy

OFF TO THE RIVER WITH THE WEEKLY WASH

It isn't a "blue Monday," however, for the gathering at the open-air washtub is as much a social as a workaday affair, where the local gossip can be passed around. Besides her duties at the tub, the peasant woman, always a hard worker, must tend the cattle, milk the cows, make cheese, perhaps spin and weave, clean, cook, and in season help in the fields. On winter evenings, by candlelight, she makes the fine laces and embroideries for which she is famous (see, also, page 83).

Diocletian, and Maximian, assuming the Eternal City's imperial purple.

In the third century B. C. Illyria advanced from the status of a geographical region to that of a kingdom which comprised the Adriatic's eastern shore as far south as Albania; and in 180 B. C., when the people of Dalmisia (the modern Almissa) revolted from the Illyrian crown, the state of Dalmatia emerged.

Just north of Zara (Zadar) we entered the waters of ancient Dalmatia. Ranging in width from one to 35 miles, this little sliver of a state enjoyed a well-developed coast which played its famous rôle in the sea commerce of the Middle Ages.

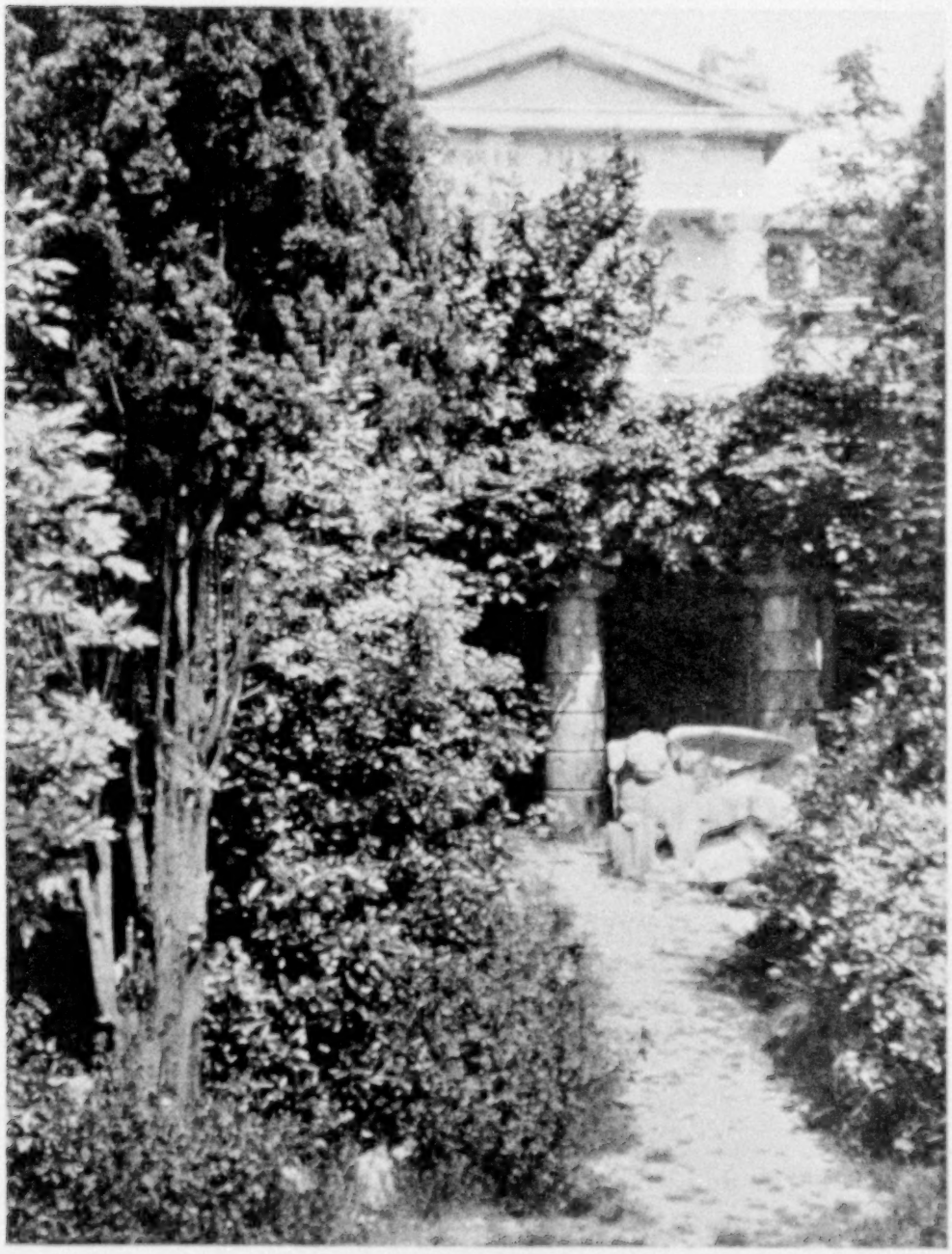
Dalmatia of to-day has an area of 4,916 square miles. The industries supporting her 650,000 people are cattle breeding, viticulture, cereal raising, and, of course,

fishing. Her nets are tended by 10,000 fishermen, who haul up annually some 4,000 tons of finny wealth. Though salt shortage and other causes have diminished Dalmatia's cannery trade, she was in post-war days a formidable picnic provider, with a yearly output of 2,500,000 tins of sardines.

THE HOME OF THE "MARASCHINO"

Zara, once Dalmatia's capital and still her chief center for turning the *marasca* (wild cherry) into "maraschino," is a charming little promontory town whose ancient fortifications have been modified into a marine parade.

A ramble through the Italianate streets and squares puts one quite in key to tell one's waiter, *"Spaghetti ed un po' di Chianti!"* Only the presence of Croatian peasants resplendent in embroidered jackets, red sashes, and red pill-box caps—the men wearing baggy-seated knee pants, the women wearing brilliantly patterned, ruglike aprons, and all wearing toetilted, rawhide sandals—served to remind us that, although on Italian-administered soil, we were in the land of the color-loving Slav (see illustration, page 59).



Photograph by Melville Chater

"JUNKED" ANTIQUITY AT SUŠAK

Now as some crumbled column, now as some bleared coat of arms over a once-ducal archway, or again as a disfigured slab bearing the Bible-brandishing Lion of St. Mark, the specter of the Venetian Republic still haunts Dalmatia. This slab lies before the mortuary chapel of Tersatto, the ruined castle of the Frankopans (see, also, page 53) at Sušak, the Yugoslav sister town to Italian Fiume.

Meanwhile the Velebit's sea-skirting ridge had reached its maximum at 5,768 feet and had fallen away, as the Dinaric Alps thrust forward their continuing barrier. In fact, the entire Yugoslav coast—its sapphire waters, its ports and red-roofed villages, its tropical oases of palmettos and cactus—has an almost unvarying background of mountain walls, yellow and barren as sea sand, which frame the picture with a certain barbaric magnificence.

En route from Zara to Šibenik, when a gale got on its hind legs and kicked the hitherto placid Adriatic into whitecaps, and soup plates volplaned across the dining saloon, we mentioned "bora" to the skipper.

He grinned and said, "It's only a bagful of breeze. And anyway, when the

Photograph by Melville Chater

NURSING A SORROW FOR 500 YEARS

At Crkvenica, a watering resort on the Adriatic, the women have worn black ever since the beloved Frankopan (Frangipani) family of petty potentates was driven from the region in the fifteenth century (see, also, page 53).

real bora strikes this coast, we sailormen have no monopoly on sudden death. It's not so many years ago that the bora came tearing down through a mountain gorge, hurled a passenger train off the rails, and—well, I saw that wreck. Give me a wet death!"

ŠIBENIK SENDS ALUMINUM ORE TO AMERICA

Hill-crowned Šibenik, from whose busy quays 100,000 metric tons of bauxite are exported annually to the aluminum factories in the United States, possesses the unusual combination of fine medieval monuments with a population to match; for it goes back to the Middle Ages, that extraordinary regalia of red-and-black shakoes, rainbow-hued aprons, filigree-embellished bodices and jackets, which makes gay the town's exclusively native population.

One finds here the appearance of a carnival on every street corner, the makings of a fancy-dress ball at any market booth. Western clothes are recalled with horror. And one marvels that it is these simple peasants who, with their hand looms and embroidery needles, have preserved the antique picturesqueness of human apparel (see Color Plates I and XVI).

A Sunday morning's gathering of worshipers, thus costumed, in the town's Venetianate cathedral piazza, now named Wilson Square, is a spectacle that plunges one into the Middle Ages. It was Messer Georgius Matthei Dalmaticus, master architect, who planned this stone flower of an early Renaissance cathedral.

A CHAUCERIAN PAGEANT IN STONE

But another genius, albeit nameless, contributed his master touch thereto, a touch so warmly human that the beholder's heart throbs across the centuries in tune with that of the Unknown Carver; for, on the exterior surface of the cathedral's rear wall and almost within arm's reach, he carved a stone frieze of some seventy little heads, portraits of the men and women of his day (see page 61).

They are instantly recognizable—the spade-bearded merchant, the doughty

Photograph by Kilophot

ZARA IS A CITY OF CONTRADICTIONS

The seeming paradox of its Italianate streets peopled with Croatian peasants in resplendent costumes is explained by the Treaty of Rapallo, which defines this one-time capital of Dalmatia as a free city under Italian jurisdiction. The ancient fortifications of the charming little promontory town have been modified into a marine parade.

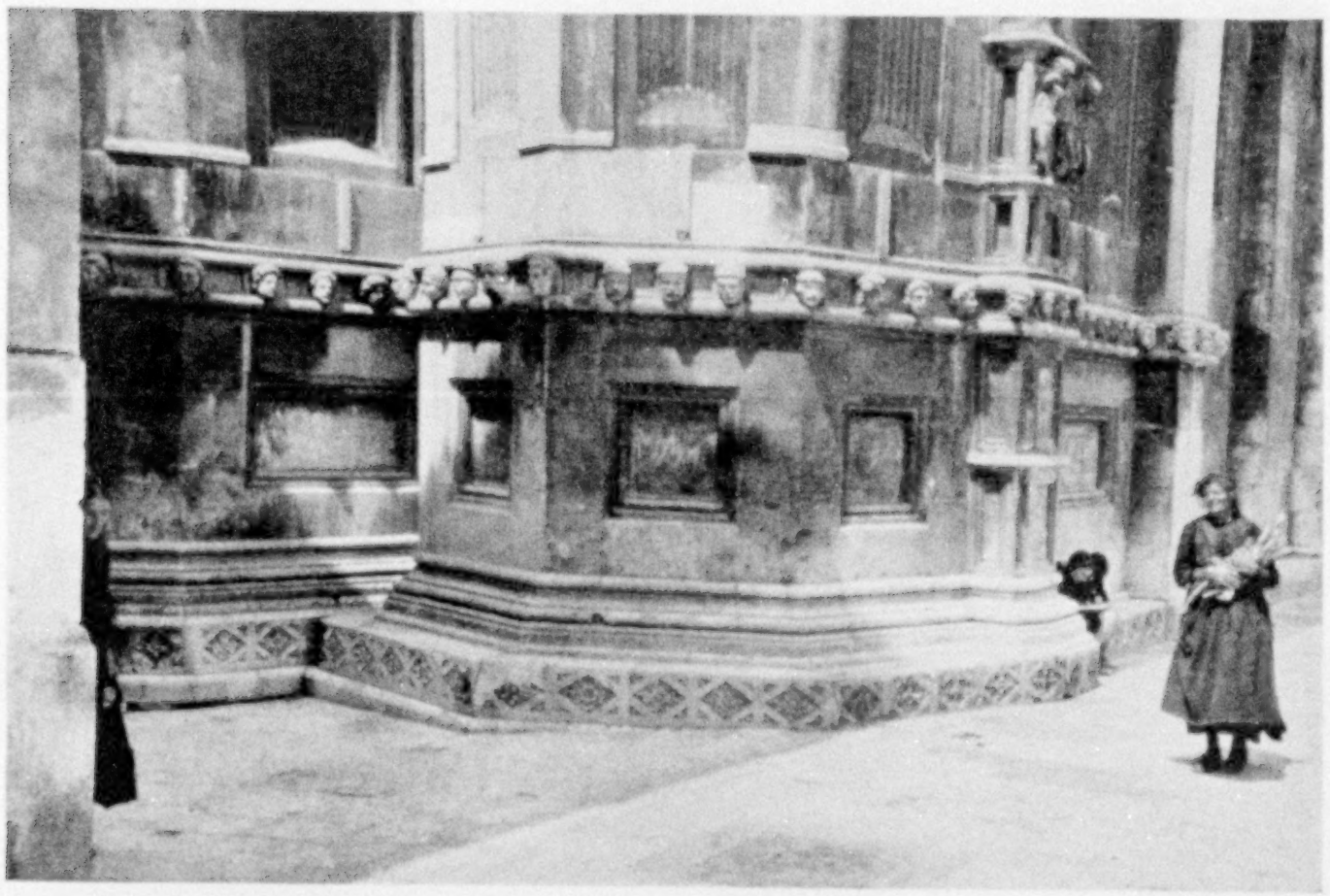
A FEMININE BIT OF "OLD NASSAU" ON ADRIATIC SHORES

At Vodice, a tiny, vine-growing promontory town near Šibenik, the women wear black skirts with orange stripes around hem and waist; black bodice with orange yokes across shoulder-blades and chest; black shoes, and orange head scarf (see text, page 62).

Photographs by Melville Chater

WOMEN OF VODICE FORM FOR THE RING DANCE

The slow and stately *kolo* (literally, "wheel") is a familiar dance throughout the Balkan Peninsula. On Sunday mornings, after church, the young folks assemble to dance to the music of the native *tamburica*, and the old people listen to a blind fiddler singing heroic songs.



A PAGEANT IN STONE

On the exterior of the rear wall of the Šibenik Cathedral, an Unknown Carver has wrought a human comedy in a frieze of some 70 small heads. They constitute a Canterbury pilgrimage etched in stone (see text, page 58).

Photographs by Melville Chater

THE DAISY BUSINESS FLOURISHES IN TROGIR

The workman is raking daisy heads to and fro on a canvas-covered pavement at the quay. When they are dry he will put them into bags for export as a basis for insect powder (see, also, text, page 64).

Photograph by Melville Chater

BRISK TRADING ENLIVENS THE MARKET PLACE AT SPLIT

The women are selling the wild cherry known as the *marasca*, from which the liqueur maraschino is made. The center of this industry is at Zara (Zadar) (see, also, page 57), but it is carried on at various places in Dalmatia.

Crusader, the pancake-capped squire, the cloddish peasant, the turbaned Turk, the cowled, sanctimonious friar, the whining mendicant. And such ladies! Lean-faced or fat-jowled, coquettishly a-simper or grossly ogling, they range from the Crusader's veiled dame to leering Moll o' the stews. Withal, what robust, Rabelaisian freakishness, what a vivid, Chaucerian pageant of virtue, vice, hypocrisy, folly! Here is the human comedy in little, a Canterbury pilgrimage etched in stone.

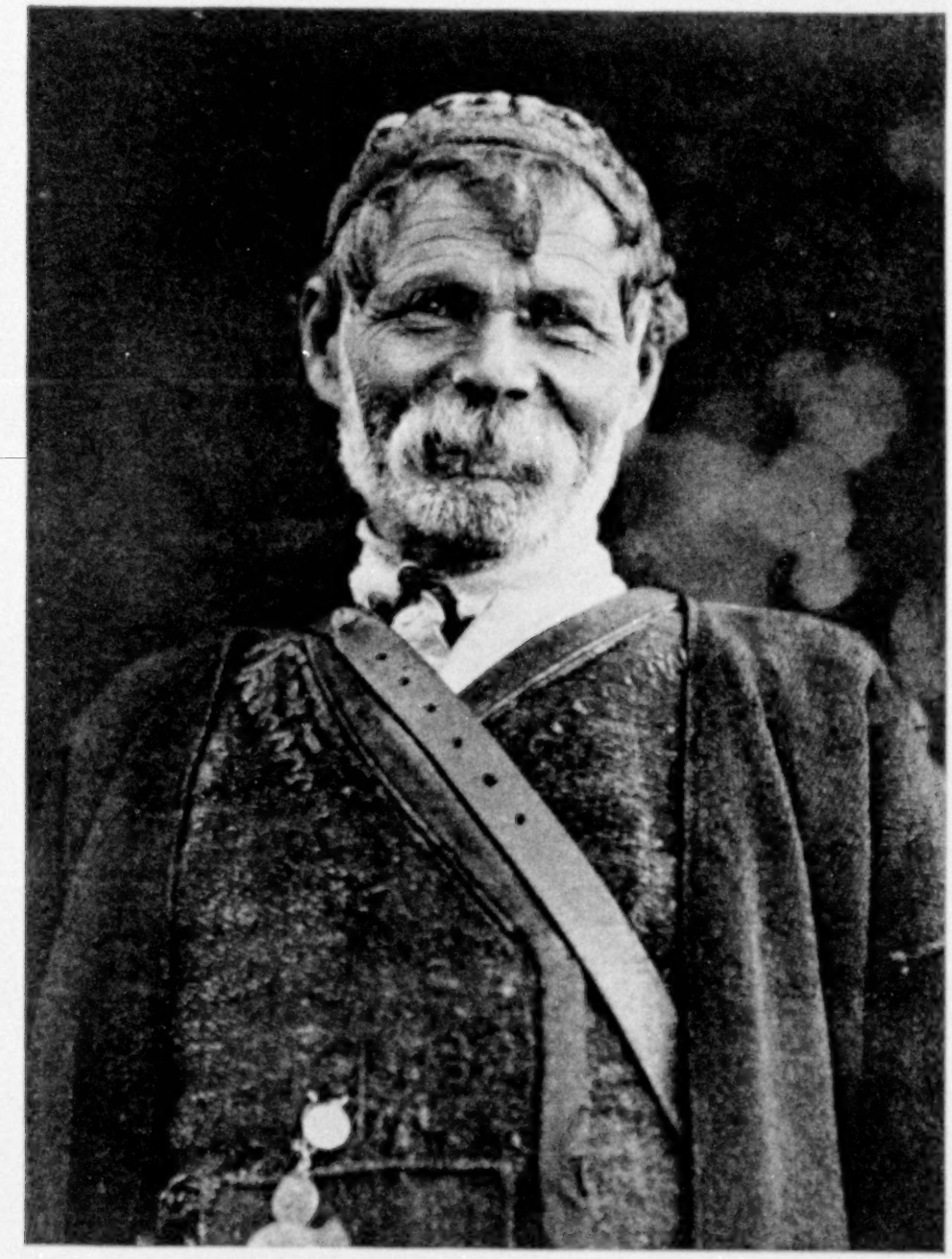
One ponders on that Unknown Carver. Was he a realist, born before his time? Was he some pot-boiling genius turned church mason, yet unable to suppress his art urge? Surely, whenever Messer Georgius would cheer on his workmen with "Put God into the fashioning of our church!" the Unknown Carver would urge whimsically, "And prythee, master, just a touch o' poor human nature, too!"

A BIT OF PRINCETON IN DALMATIA

How we discovered a little bit of Princeton and "Old Nassau" on the Adriatic's shores is worth telling. It was at Vodice, near Sibenik, on the occasion of a church festival. En route to the scene, our excursion boat picked up a stunningly costumed Vodicean girl. She wore a black, flared skirt with orange stripes around the hem and waistline; a black, balloon-sleeved bodice with orange "yokes" across shoulder-blades and chest, black shoes, and

an orange scarf, drawn tight as a skullcap, over her head. As she set down a watermelon between her feet she suggested a sort of female Princetonian quarterback about to snap the ball.

At intermediate stops several more orange-and-black Vodicean girls got aboard. "Is this Princeton Junction or what?" I heard my companion mutter. But we were unprepared for the spectacle which awaited us on Vodice's wharf. Some 1,800 souls inhabit that tiny, vine-growing promontory town, and its 1,000 women dress exclusively in the orange-and-black costume, virtually a uniform, which I have described. Well, there on the quay stood those 1,000 Princetonianesque females, whose welcoming yells needed only a megaphone-brandishing cheer-leader to confirm our fleeting suspicion that some one had just made a touchdown or clouted a homer with the bases full (see page 60).



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HARSH OF ASPECT BUT LIGHT OF HEART

Except in the sheltered valleys of the littoral, Dalmatia's soil is poor, and the hard-working peasant farmers have little more than a tenth of it under the plow. Before the World War individual proprietorship was rare, the land being held by the *zadruga*, or household community, now obsolete. The present government's first step was to abolish feudal privileges—many of Dalmatia's land rights dated back to the period of Roman colonization—and to expropriate the landed estates. The present proposal is that the peasants become the proprietors of the land they cultivate.

The ex-consul, who is a strong Yale fan, with two boys at that university, grew quite annoyed at this orgy of Princeton colors. I believe if I hadn't soothed him he would have burst defiantly into song about the prowess of Old Eli's sons.

FEMININE VANITY ALMOST OVERWHELMS THE AUTHOR

But let no one suppose that the habitual wearing of identical costumes disturbs the Vodicean female's conviction that, be she flapper or grandmother, she is the best-dressed woman in town. "I'll take a photogr—" Hardly had the fatal words passed my lips when from 1,000 throats there arose a chorus of delighted shrieks. —"of just *one* costume," I hastily amended; but it was too late.

The human sea of orange-and-black femininity precipitated itself upon me and my camera, and I narrowly escaped by

fleeing to a housetop. Finally the mayor pacified the baffled mob by announcing that if the ladies would perform the Dalmatian *kolo* (round dance) in the public square, every last one of them would appear in my photograph (see page 60).

Our next stop was Trogir. Though but a few hours from such considerable towns as Sibenik and Split, this walled and seagirt townlet, with its primitive folk, its superb church architecture, and its doorways adorned with crumbled carvings of the Venetian period, seems as remote from to-day as the street life depicted in some medieval painting (see Color Plate V).

Trogir has its lofty campanile—no unworthy second to that at Venice—and a Gothic cathedral whose portal, carved with quaint scenes of the Annunciation and the Nativity, is one of those unexpected gems in which Dalmatia abounds.

GATHERING DAISIES FOR INSECT POWDER

Near Trogir's towngate, with its inevitable, seaward-facing Lion of St. Mark, I found natives raking millions of dried daisy heads to and fro on a canvas-covered pavement. Puzzled, I made a dumb-show inquiry of the foreman. He looked up and began scratching himself. I repeated my dumb show, and this time he scratched himself all over, while prudently I moved to windward of him.

"It seems too bad they don't import insect powder," I remarked to the ex-consul, who had just strolled up. "And is this outfit the Dried Daisy Products Corporation? If so, what does it produce?"

He questioned the foreman; then laughed: "He says he tried to put the idea over to you by scratching himself. It seems that Trogir exports dried daisies for the manufacture of insect powder."

By post automobile, along the beautifully cultivated Riviera of the Seven Castles, we came to Solin and Split. The former, now a busy harbor, figuring importantly in Yugoslavia's annual cement exportations of 350,000 tons, assumed archeological importance in 1833, when excavations revealed the remains of Salona, once the capital of Roman Dalmatia.

Solin is the preface to Split. Surely no city ever had a more picturesque advent than when barbarian torches fired Salona in 620 A. D., and its refugees trekked to the deserted palace of a long-dead Roman emperor and, rabbitlike, burrowed in. And their descendants haven't moved out yet. You may still trace Split's strange beginnings by wandering about the mammoth structure, powerfully walled and gated, whereto the invalid Diocletian retired upon his abdication (see Color Plate XI).

AN ANCIENT EMPEROR'S PALACE HOUSES 3,000 PEOPLE

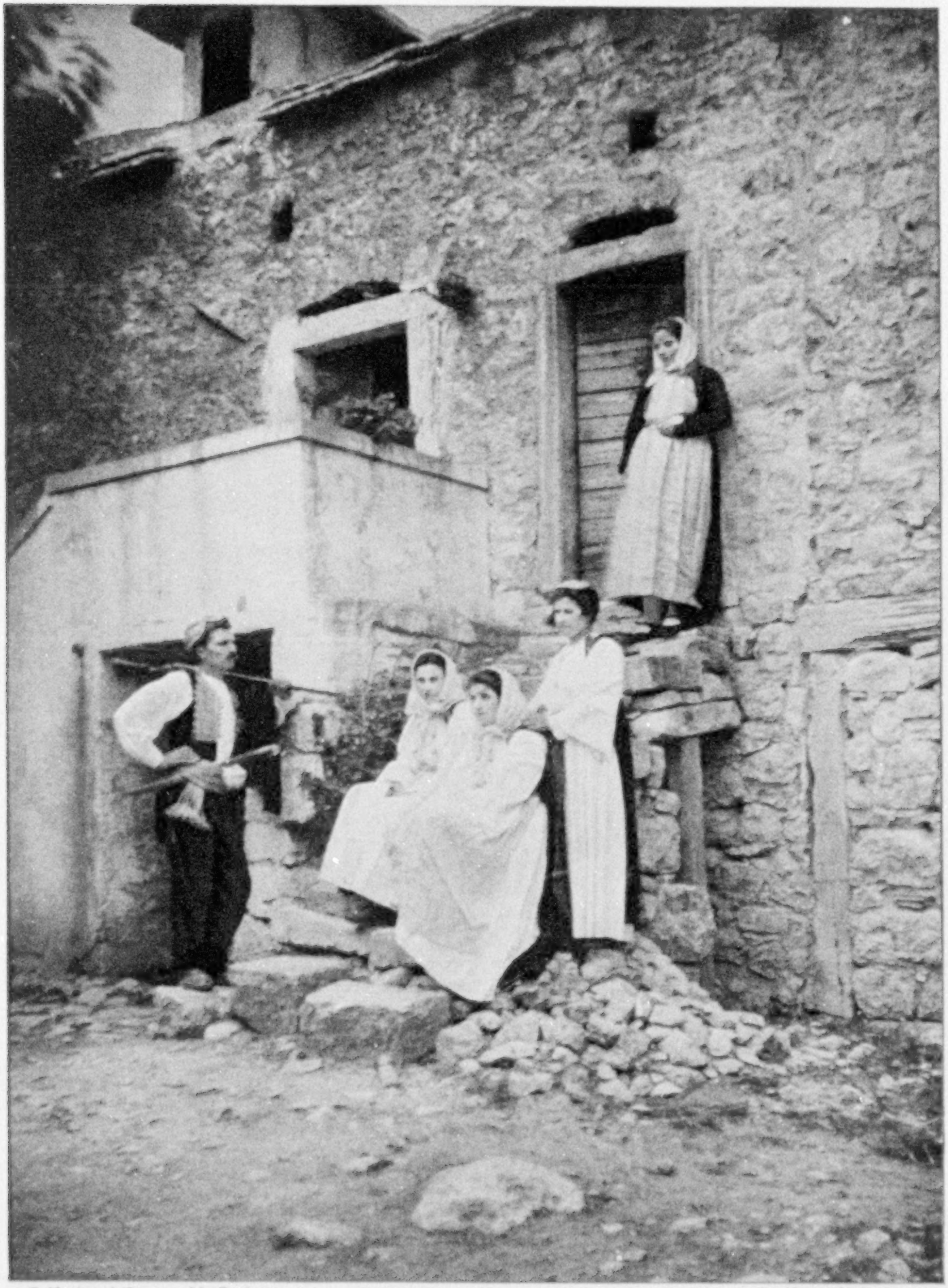
Incidentally, the size of a Roman ex-emperor's retinue may be gauged by the fact that this once-splendid palace, within whose walls a web of streets and a parasitic growth of dwellings have developed, houses 3,000 people.

Its sea-facing frontage, commanding the palmetto-fringed esplanade and the busy quays which render Split the chief Yugoslav port, offers surely the strangest spectacle that ever revivified a Roman palace; for here, set high in a wall in which 38 Corinthian capitals are imbedded, are rows of humble, green-shuttered windows where shirtsleeved fathers smoke their pipes, and grandmothers water potted plants, and mothers patch garments for their swarming broods.

Turning a palace into a tenement-house formed the kernel of a city which to-day numbers 32,000 people. And though its Venetianate streets of balcony and archway will continue to expand, due to Split's commercial importance, they will never outlast their Roman-built, slum-inhabited nucleus, where, among pagan temples abutting on drinking dives, the very stones seem to cry out, mocking an ephemeral modernity, *"Ave Roma immortalis!"*

Split's museum authorities have combed the region to collect precious examples of that embroidered, wide-sleeved, one-piece gown, now fast disappearing from among the peasants, which was derived from what Dalmatia gave to the world as a liturgical garment, the dalmatic, 1,700 years ago.

As for the still discoverable Bosnian bodice, literally sheathed in gold and silver coins, it represents more female cunning than is immediately apparent. Said



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PEASANTS OF THE LAND WHERE EAST MEETS WEST

During the last two centuries the Dalmatian coast has been successively the possession of Venice, France, and Austria. To-day, as an integral part of the new Slav state, the Kingdom of the Serbs, Croats, and Slovenes, it links the Eastern and Western zones of civilization.

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THE QUEEN CITY OF THE SOUTH ADRIATIC

Backed by hills whose only snows are midwinter almond blossoms, and with sky-blue seas and sea-blue skies, Dubrovnik (Ragusa) invokes all the magic of medieval Adriatic days. Soft climate, tropical flowers, mellow architecture, and Old World atmosphere attract throngs of visitors from south-eastern Europe to this historic seaport (see also Color Plate XIII).

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BARBARIAN TORCHES CREATED SPLIT

When the Avars fired near-by Solin (Salona) in the seventh century, its inhabitants trekked to the deserted palace of Diocletian at Split (Spalato), and founded a new city within its walls (see also Color Plates XI and XV). This view from Mount Marjan shows the palmetto-fringed esplanade and the busy quays of Yugoslavia's chief port.

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ROCK-CROWNING KLIS DEFIED BESIEGERS OF OLD

The strong position of this fortress near Split, known as Clissa in prewar days, caused it to play a prominent rôle in the Turkish wars. From the village at its base hillsides green with olive trees slope gently to a valley.

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TROGIR RETAINS ITS MEDIEVAL WITCHERY

Both architecture and situation combine to make beautiful this tiny town, formerly known as Trau. Its towers, walls, and public buildings bear the stamp of Venice. It is built upon an islet lying between a larger island and the mainland.

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DALMATIAN NOBLEMAN AND PEASANT AGAINST A BACKGROUND OF RURAL SERENITY

Storied remains of historic events, brilliantly clad people, and beauty of landscape, mellowed and rugged, combine to furnish a wealth of atmosphere to Dalmatia.

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PROGRESS HAS NOT ROBBED THE DALMATIAN OF HIS PICTURESQUE ATTIRE

These prosperous peasants live in the region between Split and Dubrovnik, where the soil is fertile and the crops large. Dalmatian Slavs are commonly known as Morlachs, a name which the whirligig of language has corrupted from Mavro-Vlachs—Black Vlachs.

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REPRESENTATIVES OF A STALWART, HANDSOME RACE

Although some Dalmatians are blond, more often they have olive skins, dark hair and dark eyes, set off to advantage by their brightly colored costumes.

PEASANT CRONIES OF ZAGREB

Their vests, bright with buttons and gay with stitching, are usually worn unfastened.

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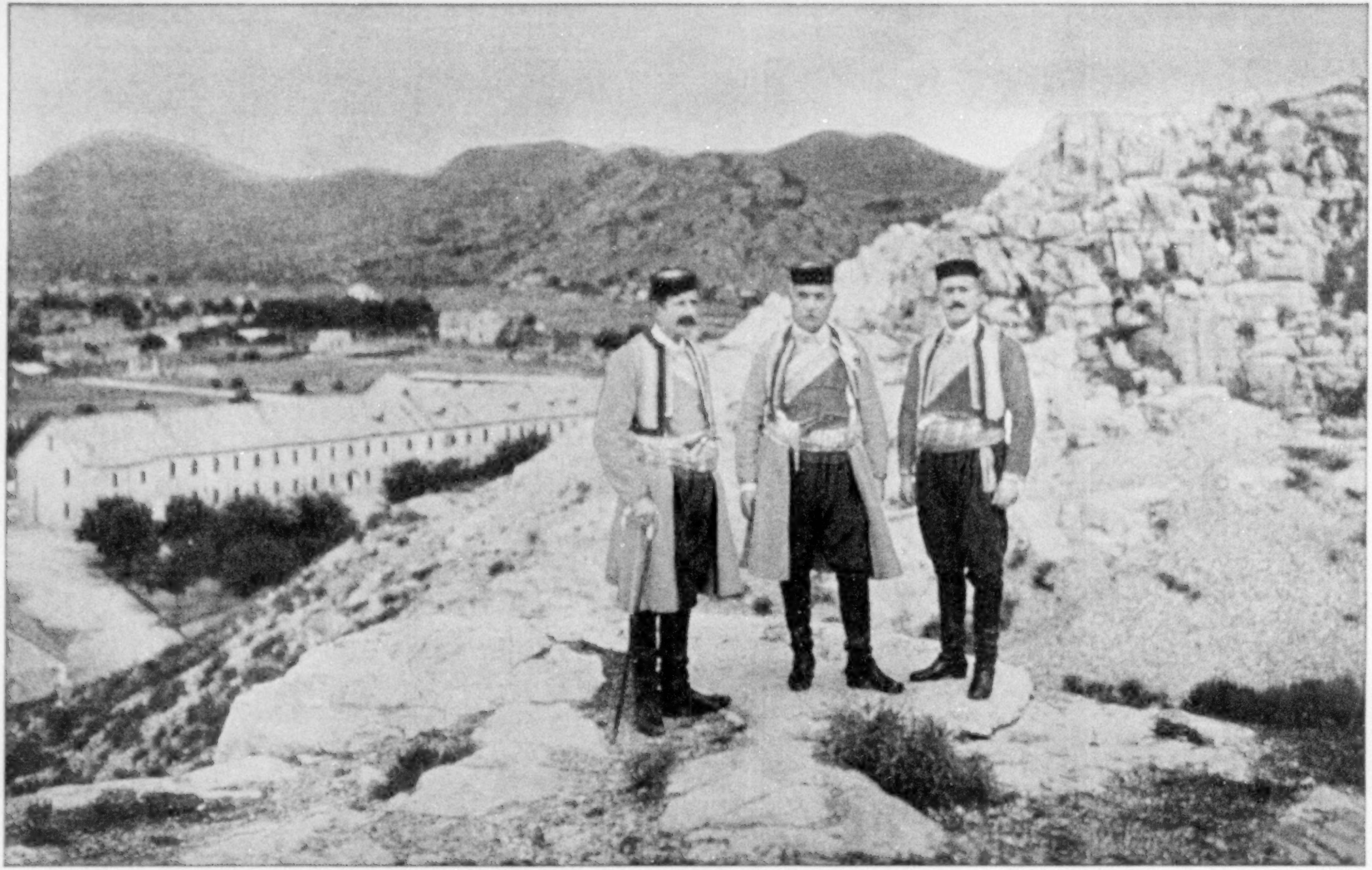
MARKET DAY AT ZAGREB (AGRAM)

Long tables, with aisles between, constitute the stalls, and the marketers display their fruits and vegetables in clean willow baskets or in neat piles.



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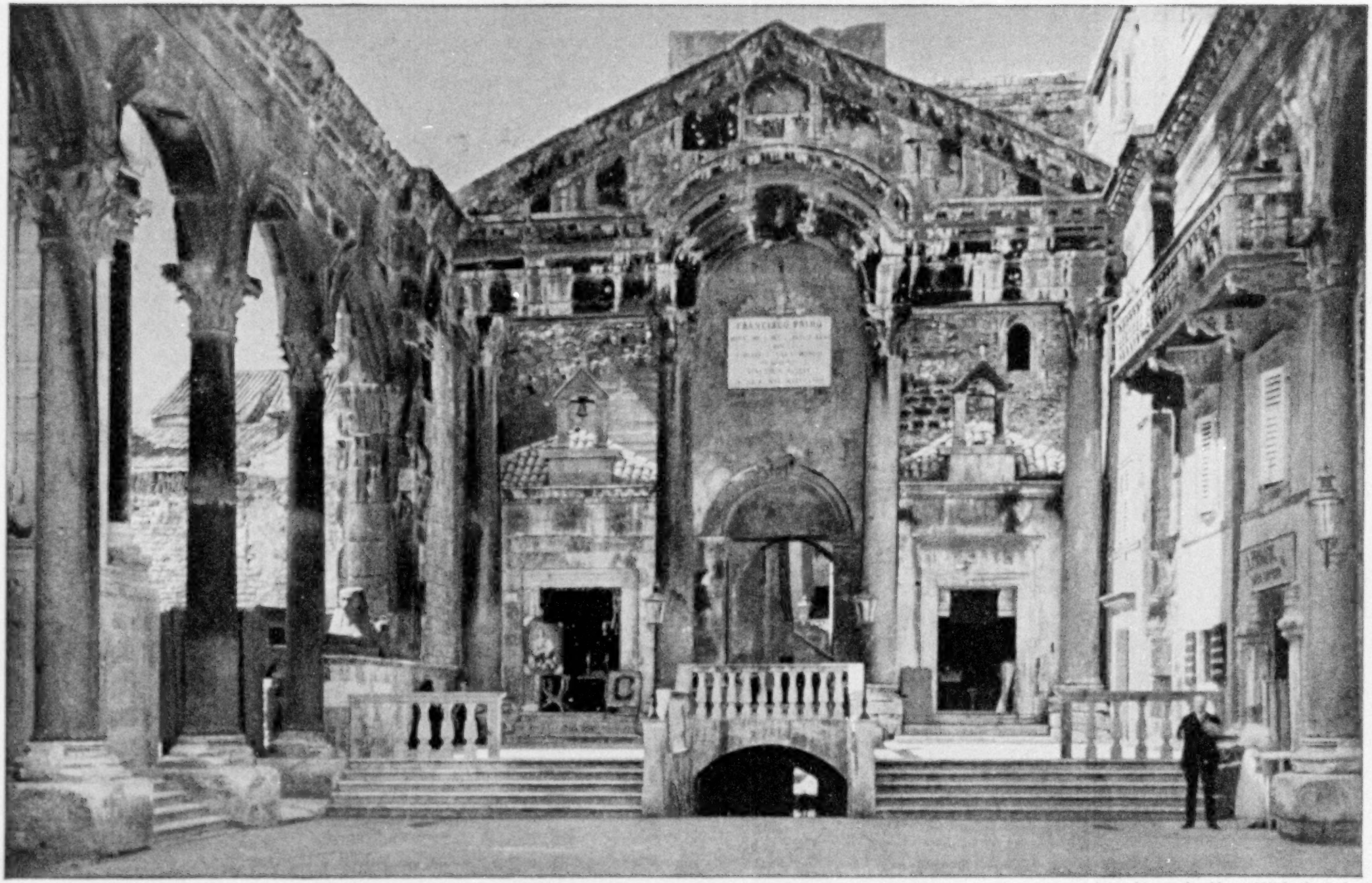
MONTENEGRO'S NATIONAL DRESS REVEALS THE INHERENT PRIDE AND DIGNITY OF ITS WEARERS

Men of the Black Mountain region wear a long, wide-skirted coat, heavily embroidered, which opens in front over a gold-decorated waistcoat. The dark blue trousers bag to the knee. White homespun incases the legs, or, if the man be a bit of a dandy, as in the case of this trio, a pair of high black riding boots. The broad belt of plaid silk which confines the coat to the waist holds a full assortment of knives and pistols, without which the man's toilette is incomplete. Montenegro, formerly an independent kingdom, was absorbed into the Serb, Croat, Slovene state at the conclusion of the World War.



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A PORTION OF A ROMAN EMPEROR'S PALACE FORMS SPLIT'S TOWN SQUARE

This was the center and most beautiful part of Diocletian's palace (see also Color Plate III). Motley little shops and houses cling like parasites to the blackened columns of cipollino and rose-colored granite on the right. The columns on the left front the emperor's mausoleum, now the Cathedral. The four rear columns belong to what was formerly the Vestibule, at the entrance to the imperial apartments.

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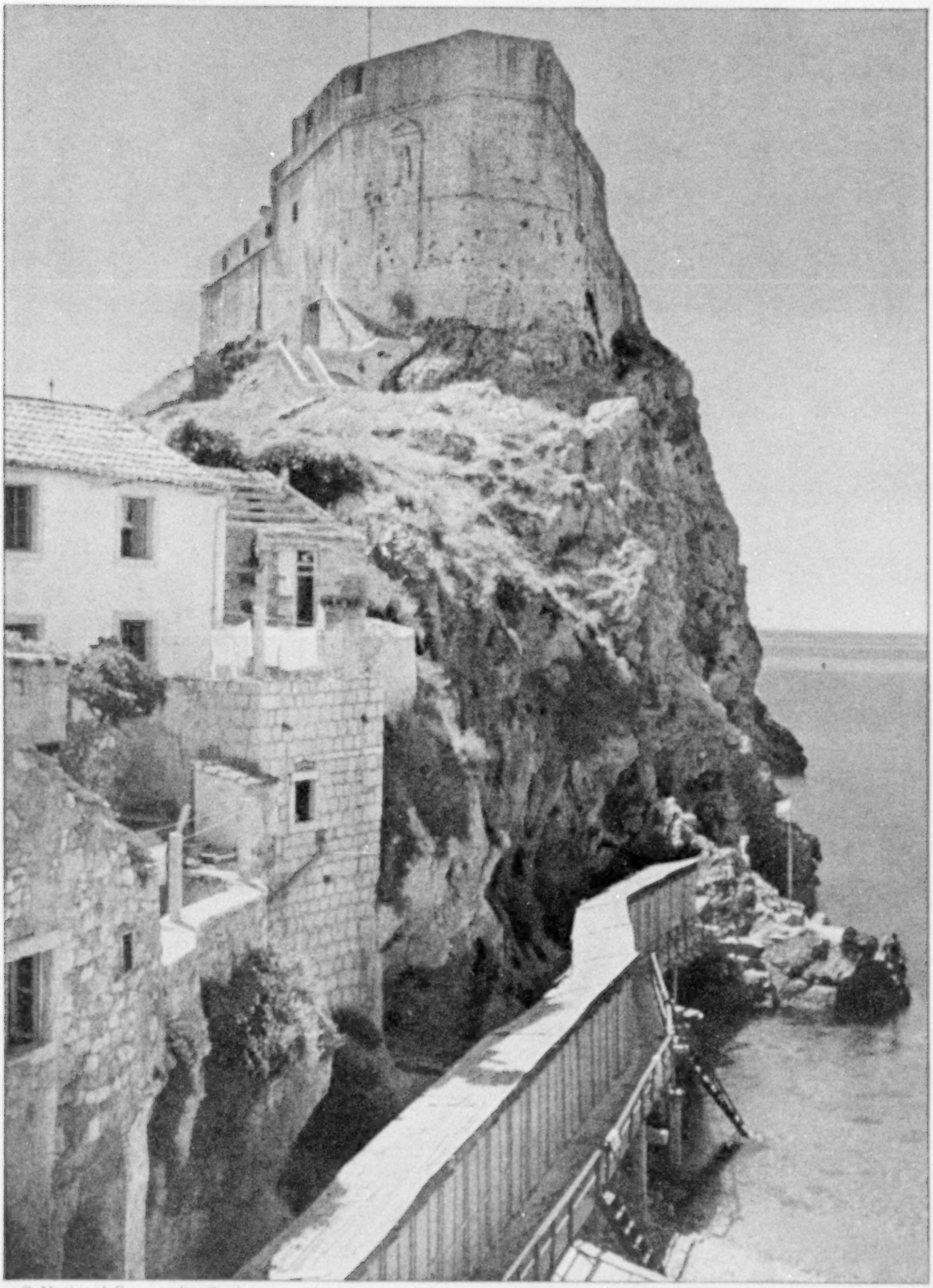
SHE PUTS HER SHOPPING BAG TO MANY USES

It serves as cradle for the baby, a wardrobe for clothes, a larder for provisions, and as transportation for little pigs market-bound. Many peasants like these of the Breno Valley, near Dubrovnik, came to America as immigrants before the World War.



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RAGUSA MILITANT CONJURES UP A DRAMATIC PAST

Rock-set, rampart-encircled, sea-washed old Ragusa, now known as Dubrovnik, is so richly medieval that the beholder cannot separate it from the name under which it achieved its glories as a powerful city republic, worthy companion of Venice and Genoa in the fourteenth century.

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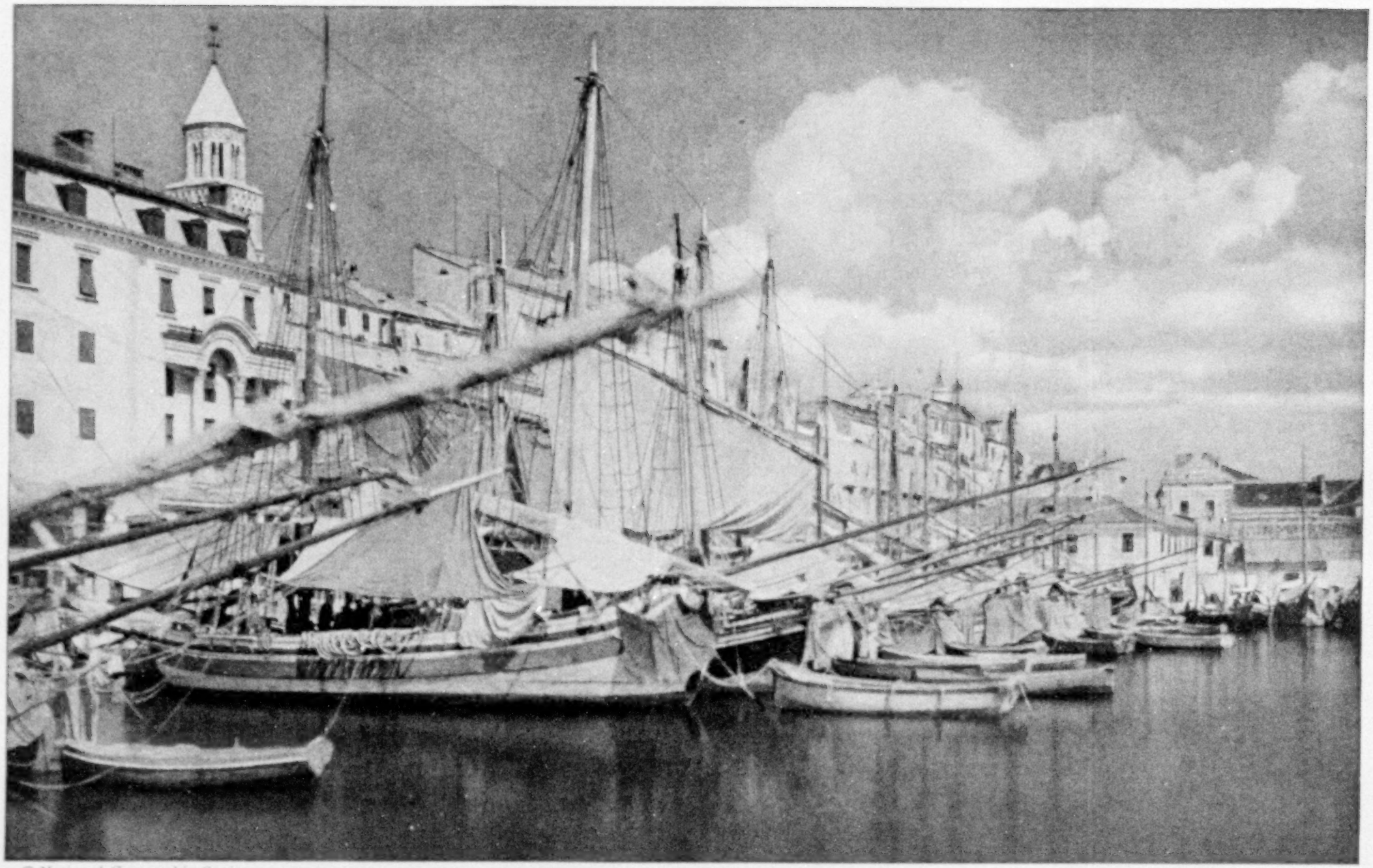
Autochrome by Hans Hildenbrand

THE BRIDGE OF TIME ARCHES THE NERETVA (NARENTA) AT MOSTAR

Whether Roman or Turkish in origin—the point is disputed—this graceful stone span, with flanking gate towers, forms the chief glory of a picture city to which it gave its name. Difficulties in building the foundations disappeared, so the legend goes, when someone had the questionable inspiration of burying two lovers beneath the piers.



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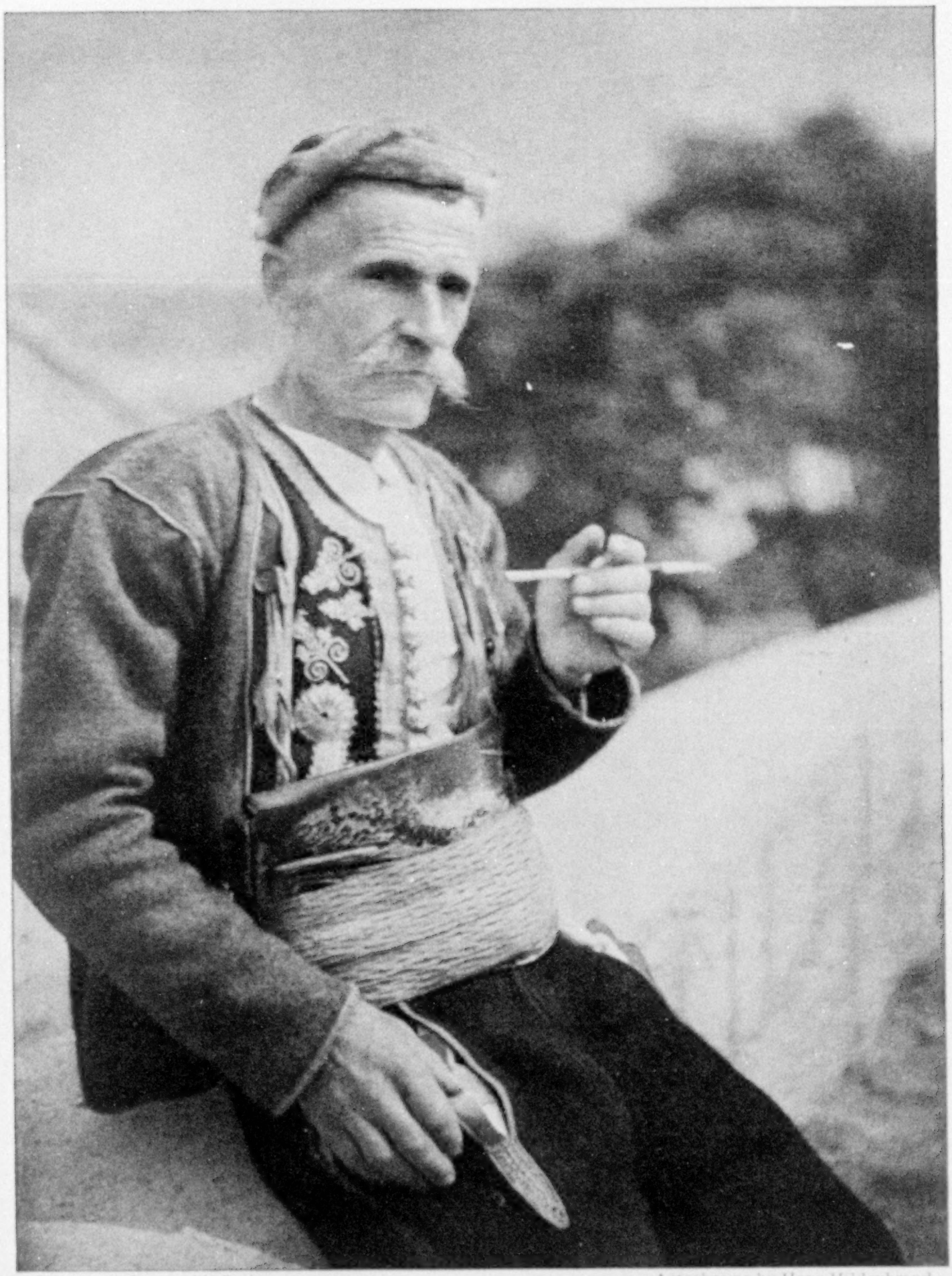
SPLIT'S FISHING BOATS FURL SAFFRON-COLORED SAILS

Behind the jumble of masts and rigging are the remnants of Diocletian's open gallery, with shabby houses wedged in between majestic half-columns and arches.



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HE RELIES UPON HOUSEHOLD INDUSTRY FOR HIS GAY APPAREL

In the land of the color-loving South Slav, it is the simple peasants who, with hand loom and embroidery needle, preserve the picturesqueness of both masculine and feminine costumes.

my native informant, "Bosnian girl who hasn't got a boy yet, she just puts on that money-shirt and sits in bazaar; and pretty soon, you bet, she gets nice boy!"

HISTORIC CITY MASQUERADES UNDER ANOTHER NAME

Coasting seven hours farther southward, through an astonishing group of islets which lay clustered like lily-pads on a lake, we came, via the pretty harbor of Gruž, to its historically famous neighbor, now known as Dubrovnik.

"No!" objected the ex-consul, when we had explored every fascinating nook and corner of that rampart-encircled, sea-washed citadel of a medieval town, "Dubrovnik as a replacement name, however ancient, won't do. Ragusa forever! I'll yield to the Adriatic being the 'Jadransko,' and to 'Krk' and 'Krf' standing for Veglia and Corfu and not for broadcasting stations; but I simply can't think of the classic Republic of Ragusa as being 'Dubrovnik.'"

And, indeed, so richly medieval is this rockset town that the beholder cannot separate it from the name under which it achieved its medieval glories. If the north Adriatic has her resplendent tiara in Venice, the south Adriatic has her gem-starred coronet in Ragusa (see Color Plates II and XIII).

Backed by hills whose only snows are midwinter almond blossoms and whose terraced trees—olive and aloe, fig and orange, date palm and myrtle—cut the briny air with their blend of southern smells, there arise those medieval ramparts which encircle the domes, the markets, the Venetian-Gothic piles, the shops, and the red-tiled homes of 15,000 people. One would have to visit the much smaller Languedocian fortress town of Aigues-Mortes to behold anything comparable to the picture of Ragusa, modern yet ancient, performing its workaday tasks within 15th-century walls.

Mellow architecture, stately cloisters, ivied city gates, colorful costumes, pigeon-haunted squares, a feast of flowers, a caressing climate of sky-blue seas and sea-blue skies—all the magic of Adriatic days is here to conjure up an aromatic past and to create an abiding memory.

From history's first mention of Ragusa's shipping, down to her acceptance of Venetian supremacy, in 1205, there elapsed three and a half centuries during which the little rock-bound stronghold of refugees burgeoned forth as a miniature maritime republic whose argosies were found in the eastern Mediterranean's every port.

Ragusa's merchant fleet, at the height of her sea fame, numbered 300 vessels, which bore a "great and incredible" trade, as medieval chroniclers state, and plied anywhere from the Thames to the Holy Land. In salt-water slang, "vessel of Ragusa" became "argosy," which will remain a synonym for homeward-wafting wealth as long as poems are penned.

The little republic compiled a complex code of maritime law, built ships for looming Spain, and even sent forth her mariners with the conquistadores' expeditions to the New World.

Though luxury-loving, Ragusa nevertheless made slave trading a capital offense, thus anticipating England's prohibition of "black ivory" by 350 years.

MAGISTRATES SERVED ONLY ONE MONTH

But growing wealth brought internal jealousies, and so, to ameliorate aristocratic clashes, Ragusa limited the term of office of her chief magistrate to one month; so that he became the ventriloquial mannequin of whichever happened to be the uppermost clique, and his inferiority complex was nursed along by such regulations as that which prohibited him from wearing his foreign decorations except as a corpse at burial.

But presently the great shadow of Venice loomed eastward, and Ragusa thought it politic to flirt with the Bride of the Adriatic for a protectorate, "seeing that it appears to us of great advantage that our country should be subject to Venetian domination." And the just-quoted treaty was supplemented by a statute of inauguration which called for flag-waving, cannon-firing, sermon-preaching, and the universal shout (willy-nilly) of "Long live the magnificent Doge of Venice!"

A constitution, based on that of Venice, was adopted, and a succession of Venetian counts became Ragusa's chief magistrates.

The benefits were mutual. To Venice the little republic's Slav appellation of Dubrovnik (*dubrava*—wood) literally

Photograph by Ewing Galloway

HVAR IS THE YUGOSLAV MADEIRA

Owing to a sheltering girdle of mountains, the capital of the island of Hvar has a mild climate, which makes it a popular winter resort. Subtropical vegetation, crenelated walls, ruined palaces, and towers dating from the stirring days of Venetian ownership, are its chief attractions. Hvar is one of the many islands of the Dalmatian archipelago which protect the coast of the mainland like an interlocking line of ramparts (see map, page 50).

Photograph by Edgar S. Aldrich

DUBROVNIK IS THEIR SHOPPING DESTINATION

Photograph by Kilophot

PLYING A SKILLFUL NEEDLE

Photograph by Ewing Galloway

THE PORTA MAGGIORE IS A GATEWAY TO THE PAST AT HVAR

Formerly known as Lesina, the island of Hvar was long the chief naval station of Venice in Dalmatian waters. Its history reaches far back into the misty centuries, for stone cists and bronze implements of the primitive Illyrian race (see text, page 55) have been uncovered in barrows near the town of the same name.

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THE MINCETA TOWER CROWNS DUBROVNIK (RAGUSA)

Despite the martial appearance of its ramparts, which encircle the markets, the Venetian-Gothic piles, the shops, and the red-tiled homes of 15,000 people, old Ragusa was a peace-loving town, which, by diplomatic flirtations, now with one power, now with another, maintained its independence for 1,200 years (see text, page 89).

spelled timber for galleys. And what toll Venice took of her dependency's resinous trees is indicated to-day by the Yugoslav littoral's vast stretches of deforested country. Symbolic indeed was the Ragusan sailormen's Christmas custom of bearing a huge yule log to the resident count's hearth, while singing carols!

A COAST THAT WAS "PIE FOR PIRATES"

On the other hand, Ragusa piled up the ducats by building Venetian galleys.

Moreover, she was free to frame her own civic laws and her surprisingly comprehensive maritime code. This bore, for example, on the exact personnel of vessels, on seamen's pay rates and rations, and on the shipowner's duty to carry anti-piratical armament.

For, across the tale of Ragusa's sea fame, there runs a broad black stripe betokening the Jolly Roger. The indented, well-sheltered coast that yielded Dalmatia good portage was just the sort of hide-and-seek sea front that constituted pie for pirates. In all the annals of the plank-walking, glass-chewing, loot-and-scuttle-'em type of adventure, Dalmatia's coasts have never been surpassed.

To the list of the Adriatic's city states

Photograph by Melville Chater

THE PIGEONS OF DUBROVNIK'S MARKET SQUARE ARE A REMINDER OF VENICE

add the pirate republic of Pagania. This name celebrated the fact that its "hard-boiled" denizens had been the last Slavs, by a margin of 250 years, to withstand Christianity.

Though ultimately converted, the Paganians never let religious scruples interfere with business. For 150 years they terrorized the Adriatic, raided Venetian lagoons, and even laid that proud city under annual tribute. And though a concerted attack of Venetian galleys finally drove the corsairs from their base on the River Narenta (now the Neretva) to the island of Lagosta, they there reopened their old, established business under the skull-and-bones trade-mark and operated the surrounding waters until 1409.

They were succeeded by the Uskoks (*i. e.*, refugees), who, driven seaward by the Turkish invasion, turned pirate along Dalmatia's coasts. Due to their crafty policy of dividing their loot with the Austrian court and by giving naval service against the Turks, they were permitted to plunder Christian merchantmen for upward of a century.

"Send these sea devils far away from salt water!" insisted some one when, at last, an Austrian-Italian fleet had humbled the Jolly Roger in 1617; and accordingly the corsairs were disoriented by being deported into the mountains, the Uskoken Gebirge, whose name still celebrates the Uskok refugee pirates.

Meanwhile Ragusa continued to flourish for 150 years under Venetian tutelage. Then, in 1348, as if foreshadowing the demise of the great lagoon republic, there befell the plague, sweeping both shores of the Adriatic. "Our Lord God," says the old chronicler, "sent a terrible judgment through an awful and incurable disease, which caused the spitting of blood and swellings on the body." It ravaged Ragusa and carried off three-fifths of the population of Venice.

RAGUSA MAKES A TRIPLE PLAY—FROM VENICE TO HUNGARY TO TURKEY

The republic of the doges languished awhile, then passed out of the picture as a sea power, relinquishing the Adriatic's eastern shore in 1358. And now canny little Ragusa deemed it politic to cast a coquettish eye on the waxing power of Hungary. Once more, as under Venice, a treaty confirming independence for the

Photograph by Melville Chater

RAGUSAN LIFE EBBS AND FLOWS THROUGH THE CITY GATES

This modern seaport performs workaday tasks within romantic medieval walls. The three girls in the foreground are in Dalmatian costume.

doll's-house republic; once more a period of wealth accumulation by land and sea; for by the 14th century Ragusa had her overland trade route, which extended across the Balkans to Constantinople.

Supplying salt from her marine pans to a saltless interior was among the republic's chief sources of income. The overland trade was carried on by long strings of pack animals, which would issue from Ragusa's *sponza* (caravan headquarters) for their journey across the wild Balkans. Ahead marched an unfortunate scapegoat, whose duty it was to reassure the caravan by beating a drum throughout the day's march. In other words, if ambushed brigands killed him, the drum-beating ceased and the caravan was thus forewarned.

The Turkish invasion overran the Balkans, menacing Hungary, and thrifty little Ragusa reoriented herself. "Business as usual!" she murmured sweetly, and, cutting adrift from Hungary, cast disarming

Photograph by Publishers Photo Service

FEW WATERSCAPES IN EUROPE RIVAL IN SOMBER MAGNIFICENCE THE "MOUTHS OF CATTARO"

The three ramified, strait-connected basins, containing lakelike waters of intense blue, are ringed about by mammoth, sterile walls rising to dizzy heights that completely cut off the outer world. Kotor (Cattaro) lies at the eastern angle of the gulf, at the foot of the mountains of Montenegro. Intrenched behind grim walls and dominated by a medieval fortress, it embodies the spirit of its turbulent past.

glances toward Constantinople in case the Porte turned out to be the next power on the Adriatic.

NAPOLEON GIVES RAGUSA THE COUP DE GRÂCE

And her international tactics succeeded down to the opening of the 19th century, when, unfortunately for Ragusa, Napoleon determined on setting up the "New Illyrian Provinces" as a base for future conquest. In 1808 his military representative in Dalmatia convened the Ragusan Senate. "The Republic of Ragusa has ceased to exist." So ran the decree, pronounced to a heartbroken senate, which snuffed out the famous little city state after her 1,200 years of independence. And to-day her epitaph may be read at Paris, where *"Raguse"* appears on the roll of Napoleonic victories that adorns the Arc de Triomphe.

We covered the Ragusa-to-Montenegro stage of our journey by motor car. The Dinaric Alps' foothills resolved themselves into a series of fjord-forming promontories, as we turned inland for a five-hour drive past olive plantations, with distant glimpses of the gradually uplifting crags which encircle the Boka Kotorska.

Few waterscapes, in whatever land, can rival these famous "Mouths of Cattaro" in their somber magnificence. Ringed about by rocky walls rising sheer from the water's edge into dizzy heights that completely cut off the outer world, the "mouths" consist of three ramified, strait-connected basins over which vessels lay a zigzag course to and from the Adriatic.

The still, lakelike waters of intense blue scarcely soften one's dread of those encircling crags—mammoth, gnarled sterile—which stir one with a sense of earth's primitive convulsions. You feel as if lost in some vast lake-swallowing crater. You think of Thor and Prometheus, of Wagnerian epic and northern saga—such is the grim, dædal nudity of this vast amphitheater, fit setting for the dramas of mythical demigods.

CLIMBING TO THE TOP OF MONTENEGRO

I had just learned that one of the surrounding peaks rose to almost 6,000 feet when I overheard some one on the back seat of our car asking rather peevishly, "But when do the mountains begin?"

Up and over 125 hairpin turns which score the mountain side, our car climbed toward loftily remote Montenegro. From the summit of the pass, at an altitude of almost one and one-eighth miles over the sheer drop, at the bottom of which lay a diminutive streak marking the town of Kotor, we beheld, as a birdman from his plane, the big, blue, tri-tongued stretch of the Boka Kotorska. It was so far beneath us as to appear inert, lifeless, and the Adriatic seemed merely a hazy blueness without contour, almost suggesting vacuity.

We were on the top of Montenegro. Its only visible cultivation consisted of small cups of farmland—"cups," I say, because they were each ranged about by sheer crags. Its habitations were stone hovels. Apparently its only denizens were ragged women, hoeing potatoes, and flocks of skinny goats.

To eastward and to southward there lay revealed, with scarcely a shrub or thorn bush to break its terrible monotony, a gray, billowing mass of stone—I had almost said a petrified sea—which stretched away toward snow-clad chains along the Albanian border.

As our car skirted this grim scene, I overheard the man on the back seat reiterate, more peevishly than before, "When do the *real* mountains begin?"

At lunch time, in Cetinje, the mystery of his disappointment was explained. It turned out that he lived on the top of Switzerland and had toyed with Mount Blanc and the Matterhorn ever since he was a child. Truly, be it ever so glacial, there's no place like home!

A PISTOL PICNIC IN MONTENEGRO

At Cetinje, too, the mystery of an apparently manless Montenegro was solved for us. Indeed, though we had seen no men in the fields, Montenegro turned out to be very much of a two-gun, he-man's country. I was introduced to this fact by a gorgeous individual who wore a crimson, gold-embroidered waistcoat, scarlet shako, bolero jacket, glossy kneeboots, and a purple sash which enfolded an armament of pistols and knives. He sat among a circle of wine-sipping Montene-

Photograph by Melville Chater

A DECK PASSENGER COMES ABOARD

Since neither railroad nor motor trail runs the length of the Yugoslav coast, the sea lane is not only the oldest, but the most appropriate route by which to traverse those shores whose maritime fame antedated England's by centuries.

grin youths, similarly costumed and armed, and he greeted me with, "How do, John! I spik American some very!"

It turned out that he had been in the Yukon, and the next fact he revealed was, "Montenegro is a verree hongree countree."

"What do you work at?" I asked.

"Me—*work?*" Haughtily he shook his head.

"Then, your friends"—I indicated the gorgeously appareled wine-sippers—"don't they work?"

Again he shook his head. "Yes," he sighed, "it's a verree hongree countree. So we cheer up by taking little wines at cafés. Then some *guzla*-player come along and sing to us about Montenegrins' big fight with Turks at Kossovo, hundreds years ago; and that gets us so cheered up that we all jump around and have pistol picnic—everybody shooting in the air."

"Then who *does* work?" I insisted.

"The women milk goats and dig potatoes, if that's what you mean." And he reiterated, rather pointedly this time, "Yes, it's a *verree* hongree countree!" So I slipped him certain coins, and he insisted on firing off his pistols as a sign of gratitude and joy.

Then our motor car drove up, and we descended the great mountain side and climbed aboard the waiting steamer. Kotor dropped astern, the land died away in opalescent mists, and our Slovenian-Dalmatian wanderings resolved themselves into a memory

"Of green days in forest
And of blue days at sea."

INDEX FOR JULY-DECEMBER, 1927, VOLUME READY

Index for Volume LII (July-December, 1927) of the National Geographic Magazine will be mailed to members upon request.

BIRD BANDING, THE TELLTALE OF MIGRATORY FLIGHT

A Modern Method of Learning the Flight-Ways and Habits of Birds

By E. W. Nelson

Formerly Chief, Bureau of Biological Survey, United States Department of Agriculture

Author of "The Larger North American Mammals," "The Smaller Mammals of North America," "A Land of Drought and Desert—Lower California," etc., in the National Geographic Magazine

MAN'S interest in birds began in those far-distant primitive days when an intimate knowledge of all the wild life about him was often his only safeguard against starvation.

Long before the dawn of history the mystery in the great northerly and southerly movements each spring and autumn of vast numbers of birds of many kinds keenly interested him and stimulated his imagination. Fantastic theories were built up to account for them and entered into myths and folklore, where some still survive, even in civilized countries.

For a long period the flights of birds were considered serious portents in the affairs of men and even of nations, and priests and soothsayers used them to awe the multitude and to read the future. Literature abounds in references to bird migrations, and the poets of the sagas as well as those of more recent times have felt the mystery of these movements and have repeatedly woven them into their writings.

It has long been known that some of the smaller birds that breed in the north appear in middle latitudes on their return in July. The number of these little voyagers increases in August and the movement is in full tide in September. The hosts of wild fowl linger mainly until October and November, when the frosts of approaching winter in the north send them southward.

The multitude of Warblers that went northward in spring so gaily bedecked in all the bravery of their nuptial colors come trooping back with their young, all clad in sober hues more fitting their present prosaic task of making a living off the country, and laying in a goodly supply of fat to help meet any privations winter may hold in store in the warm southern lands they seek.

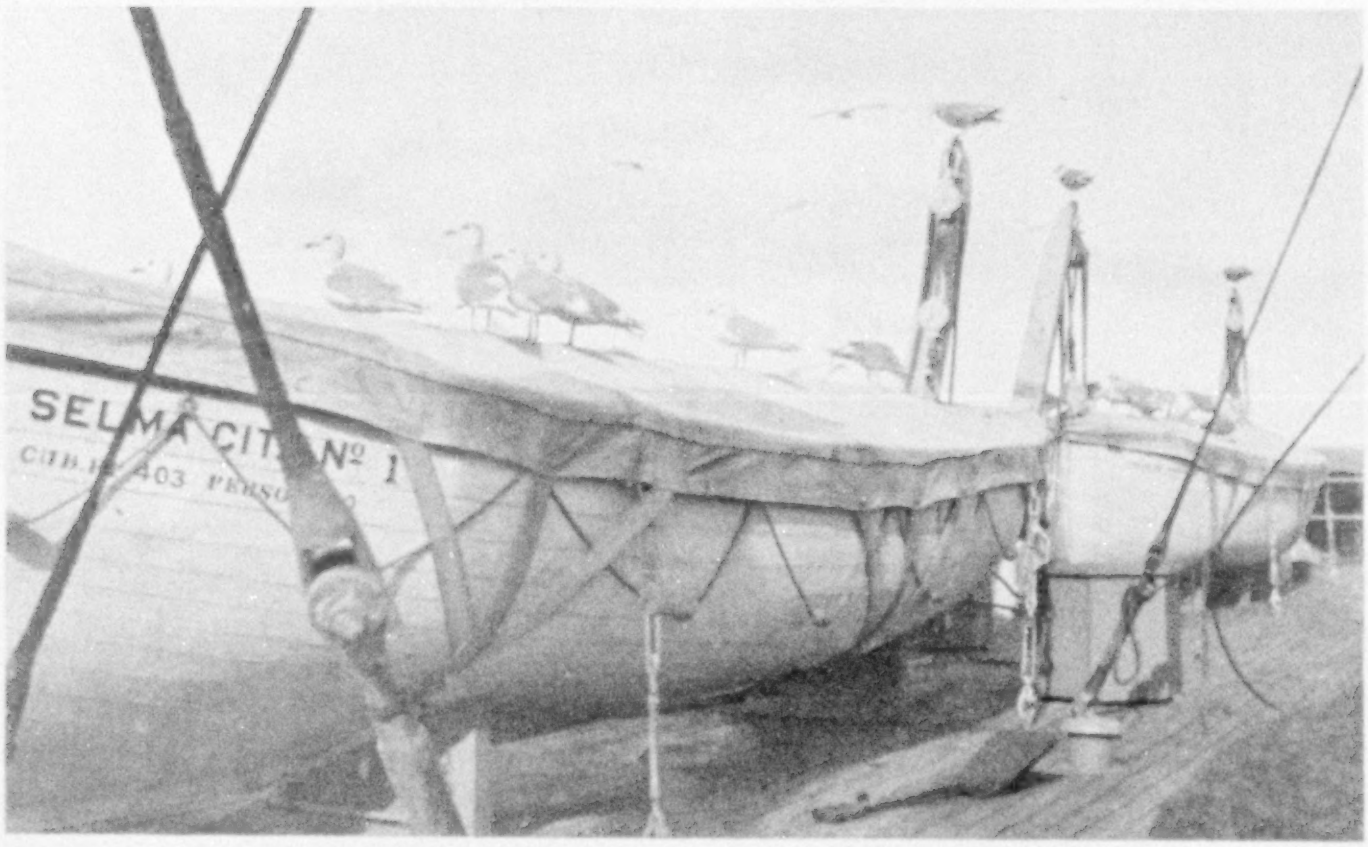
ESKIMOS WELCOME THE COMING OF THE BIRDS

In far northern lands, where untold millions of Ducks and Geese and other wild fowl go to rear their young, the advent, during the last of April or early in May, of the first of these birds is the cause of exultant joy to the people. Contentment fills their hearts, for the coming of the birds marks the end of the long, cold period of scarcity and the beginning of that part of the year in which food is again plentiful.

In the old days fur traders in Canada and Alaska rewarded with tobacco the Indian or Eskimo who saw the first Goose winging its way overhead in spring. White men joined with the natives in the jubilant welcome to the newcomer. In four consecutive seasons the writer witnessed such arrivals among the Eskimos on the icebound shore of Bering Sea.

The first comer was always a single Goose. He circled high overhead, surveying the snow-mantled region where he and his kind would later rear their young. Each time this "scout" appeared to be as excited at seeing his breeding ground as the people were to see him, and the bird would fill the air with a continuous series of loud, clanging notes, sometimes heard long before he could be seen.

After viewing the snowy landscape the scout always turned back and disappeared toward the Yukon without alighting and



Photograph by Thomas Bleyler

SOME OF MAN'S MOST USEFUL FEATHERED FRIENDS

Gulls perform very real services as scavengers, keeping many a beach clear of dead fish and other refuse. They wander far up our rivers and even breed in large numbers on the lakes of the interior.

his kind appeared no more until spots of bare ground became visible.

MILLIONS MIGRATE AS SEASONS CHANGE

The bird life of the United States is believed to total more than four billion individuals. This means that many hundred millions of migrants move north and south with the changing seasons. Though many go by day and may be seen by all who take the trouble to observe, vast numbers also pass by night.

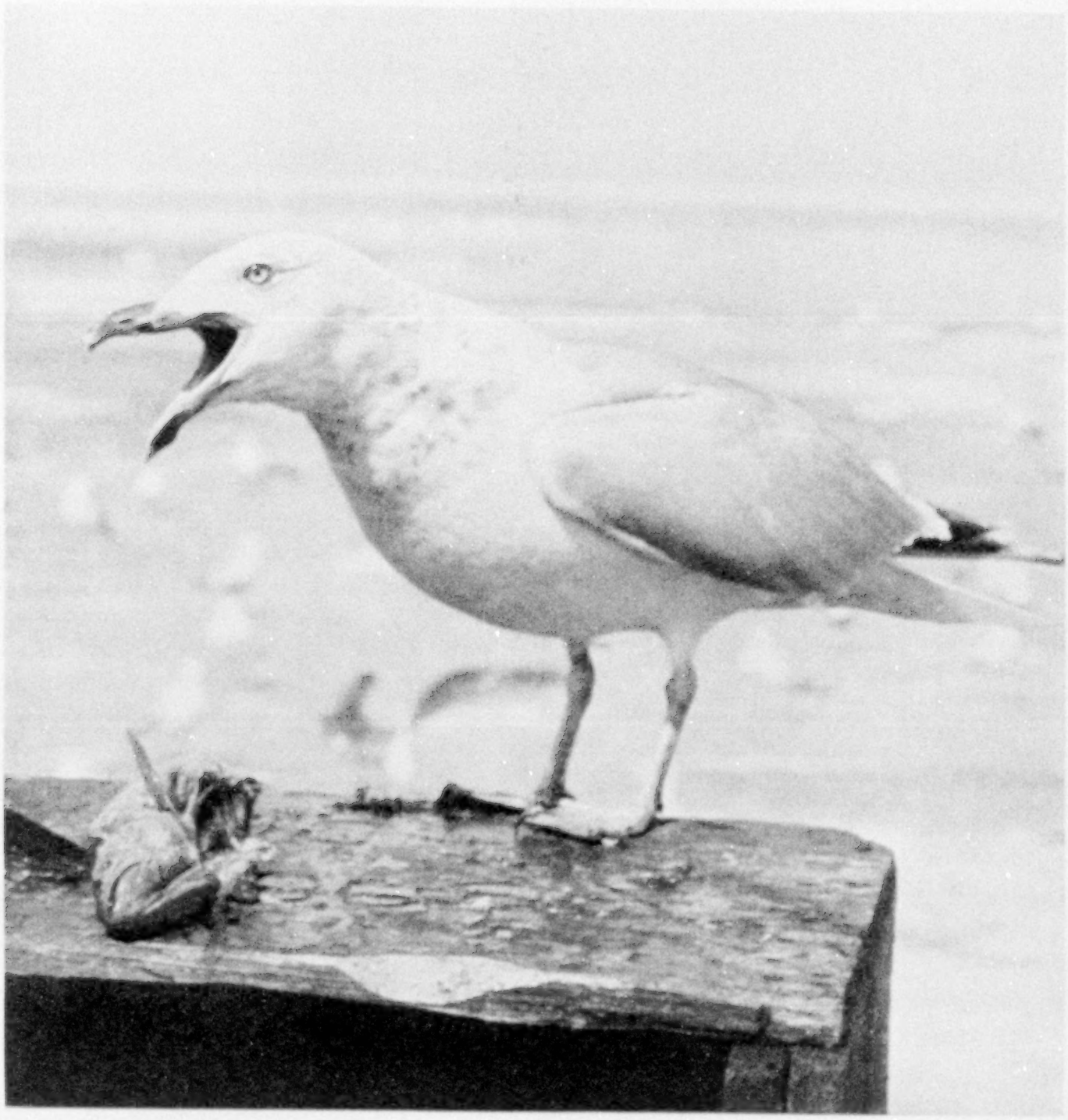
During the height of the spring migration, those whose ears are attuned to Nature's voices may hear mysterious notes overhead, many of which may be recognized. They mark the course of winged travelers exulting in springtime vigor and approaching nuptials in the haunts which they seek toward the top of the world. Telescopes held on the moon at that time often reveal their silhouettes as they cross its face.

In autumn the throng moves southward over a longer period, and the travelers wear the soberer garb of everyday life.

Though it has been plain that migrating species, in general, move north and south—the movements of some covering nearly or quite the entire length of the continent—yet only vague information on the subject has been available, since it was impossible to determine the movements of individuals. Through bird banding a method is now developed that will not only tell us where individual birds wander, but will enable us to trace their routes and determine the exact areas where they go in the north to rear their young or in the south to winter.

We may also learn something concerning the strange, sporadic occurrence of birds in parts of the world far distant from their homes.

Such wandering individuals are probably much more numerous than we suspect. This is indicated by the repeated occurrences of Robins, Bobolinks, and other American birds in England, and even on Helgoland, that insignificant islet in the North Sea where so many visitors from distant regions have been found. St. Paul Island, the largest of the small Pribilof Islands, in Bering Sea, appears to be another landing place for lost birds, judging from the number of stragglers from



© E. H. Matern

LIKE ALL GOOD SAILORS, THIS GULL HAS A CHOICE VOCABULARY

When there is no garbage about to be picked up, the Herring Gulls feed largely on small shellfish, sometimes breaking open the shells by carrying them well up into the air and then dropping them on the rocks. This operation has frequently to be repeated several times before the desired result is obtained.

eastern Asia and the Alaskan mainland that have been found there.

SYSTEMATIC BIRD BANDING IS A MODERN DEVELOPMENT

Systematic marking of birds, each properly recorded for the purpose of studying movements and habits, has developed in Europe and the United States within the past 30 years. The greatest advance has been since 1920 and it is now becoming a well-recognized line of research.

Investigators familiar with the bird life of their districts capture the birds, alive and unharmed, with many ingenious traps, and place a numbered aluminum band or ring on the leg of each. Each band bears a central address, so that whenever the bird is retaken, alive or dead, the finder may forward either the band or the number on it.

The use of birds as messengers by man began in the dim past. Perhaps the earliest record is that of Noah, who is said to

Photograph by R. D. Sloane

A PAIR OF "HONKERS" TAKE THE AIR

After being banded, these two Geese took up their interrupted migration none the worse for the markers they wore away with them.

have sent out the Raven and the Dove to prospect for land.

The first record of birds being marked to distinguish them after flight appears to be in the tenth book of Pliny's Natural History, which states that a Roman sportsman took Swallows from Volaterræ (Volterra), in Tuscany, to Rome. During the chariot races the birds were marked with colors of the winners and then liberated to carry the news back home.

For a time prior to the development of systematic banding, students desirous of lifting the veil of mystery surrounding bird movements cut the feathers so they could readily be identified. Sometimes they marked the birds with bright colors, or attached a small piece of parchment with a legend to a feather or to a leg. These crude and scattered efforts gave little information.

The first record of a bird banded appears to have been made in 1710. A Great Gray Heron, bearing several rings on one leg, was taken in Germany. One of the rings apparently had been placed on it in Turkey.

In 1899 Professor C. C. Mortensen, a school-teacher of Viborg, Denmark, began systematically to band and record Storks, Starlings, and other birds along the general lines which are still in use. Thus he became the pioneer in practical, scientific methods of bird banding, and his success led to the work being taken up in various places, especially in Great Britain, Sweden, elsewhere in Europe, and also in the United States.

The two records of birds banded in Europe being taken on this side of the Atlantic appear to be both of Kittiwake Gulls. The first was a young bird banded June 28, 1923, on the Farne Islands, off the coast of Northumberland. On August 12, 1924, it was killed in the District of St. Barbe, Newfoundland. The second was also banded on the Farne Islands, June 30, 1924, and was taken at Gross Water Bay, Labrador, in October, 1925.

AUDUBON WAS THE FIRST AMERICAN BIRD BANDER

No bird banded on this side has yet been taken in Europe, although many stray American birds have been recorded

there. One banded American bird, however, has been recovered in Africa (see text, page 119).

In the United States Audubon made the first record of bird marking, about 1803, while he was living on Perkiomen Creek, near Philadelphia. He placed silver cords about the legs of a brood of Phœbes, two of which returned to the same neighborhood the following year.

The pioneers in systematic bird banding in this country were, first, Dr. Leon J. Cole, and later Mr. Howard H. Cleaves. Their enthusiasm enabled them to keep bird banding in continuous operation from the beginning of the century to the time when the work was taken over by the Biological Survey in 1920.

No account of bird banding in the United States is complete without mention of Mr. S. Prentiss Baldwin. His able pioneer work from 1914 to 1919 in developing traps and methods for their use in the capture of small birds to be banded, and his continued investigations, merit full appreciation. His work has been done on Inwood Estate, near Thomasville, Georgia, and at Hillcrest, his summer home, near Cleveland, Ohio.

To his successful methods of operation and delightful presentation of the results to the public, combined with the entry of the Biological Survey into the work, with Mr. F. C. Lincoln in charge of this activity, may be credited much of the rapid development of this form of scientific research in America.

Photograph from U. S. Biological Survey

HE HAS BANDED MORE THAN 4,000 MALLARDS

Mr. F. C. Lincoln is in charge of the bird-banding work of the United States Biological Survey.

Extraordinary work has also been done by Mr. Jack Miner at Kingsville, Ontario, where for years he has carried on the banding of Ducks and Geese attracted to his refuge. He states that 40 per cent of the birds he tags in the autumn return the following spring. Geese bearing his bands have been taken in 23 States. His sanctuary is an unparalleled object lesson of the confidence which may be established between man and wild things when the approach is undertaken in the right spirit (see pages 96-97).

One demonstration of the keen interest in bird banding has been the formation of four regional bird-banding associations, among which has been divided all of the

Photograph by R. D. Sloane

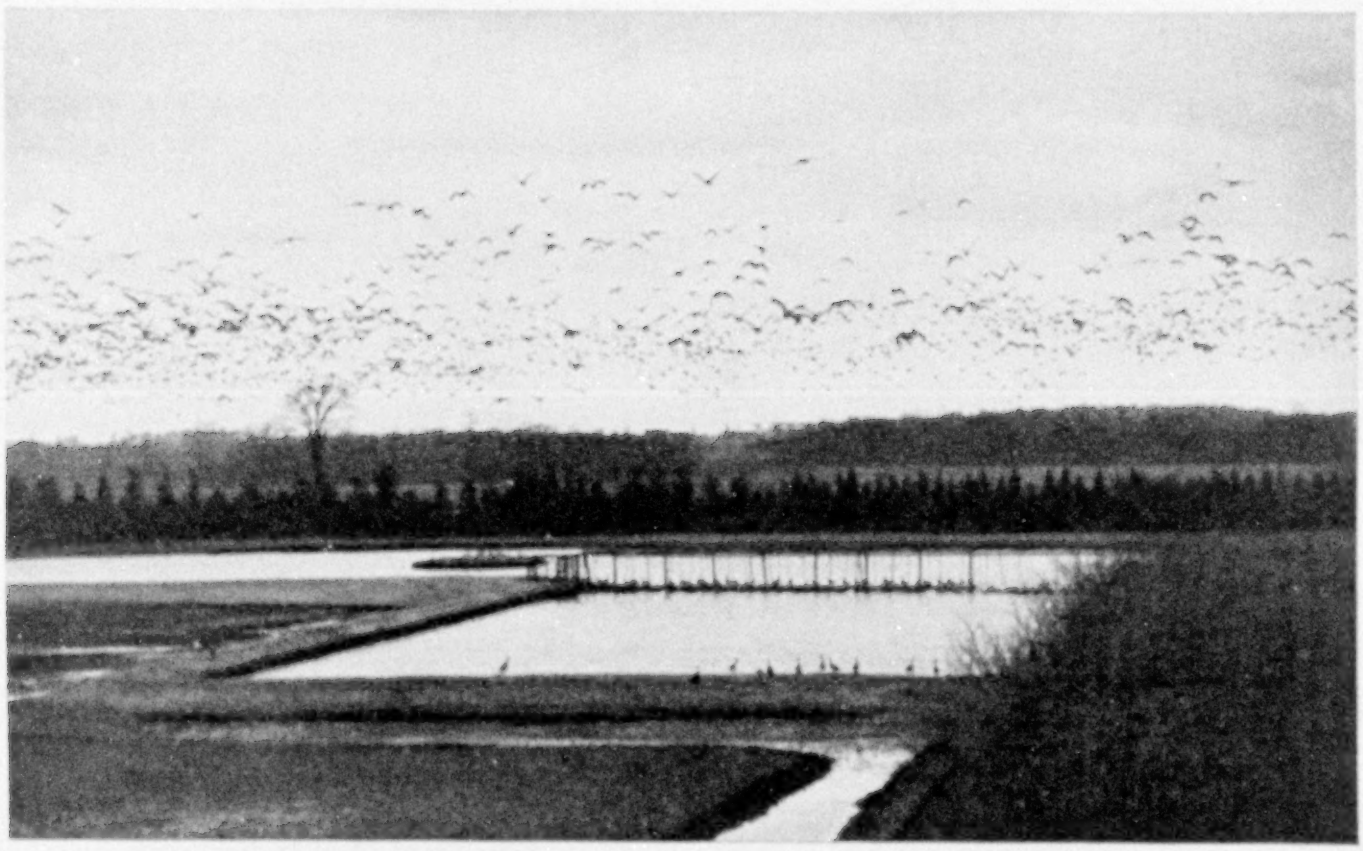
CANADA GEESE TAKE ADVANTAGE OF A FRIEND'S HOSPITALITY

By using corn instead of shot, Mr. Jack Miner has attracted many wild birds to his sanctuary. Once a professional hunter, he is now a conservationist. Each of his bands contains a verse of Scripture and he calls the birds on which he places them his missionaries.

Photograph from W. Oliver Wise

BANDING FEATHERED ROYALTY

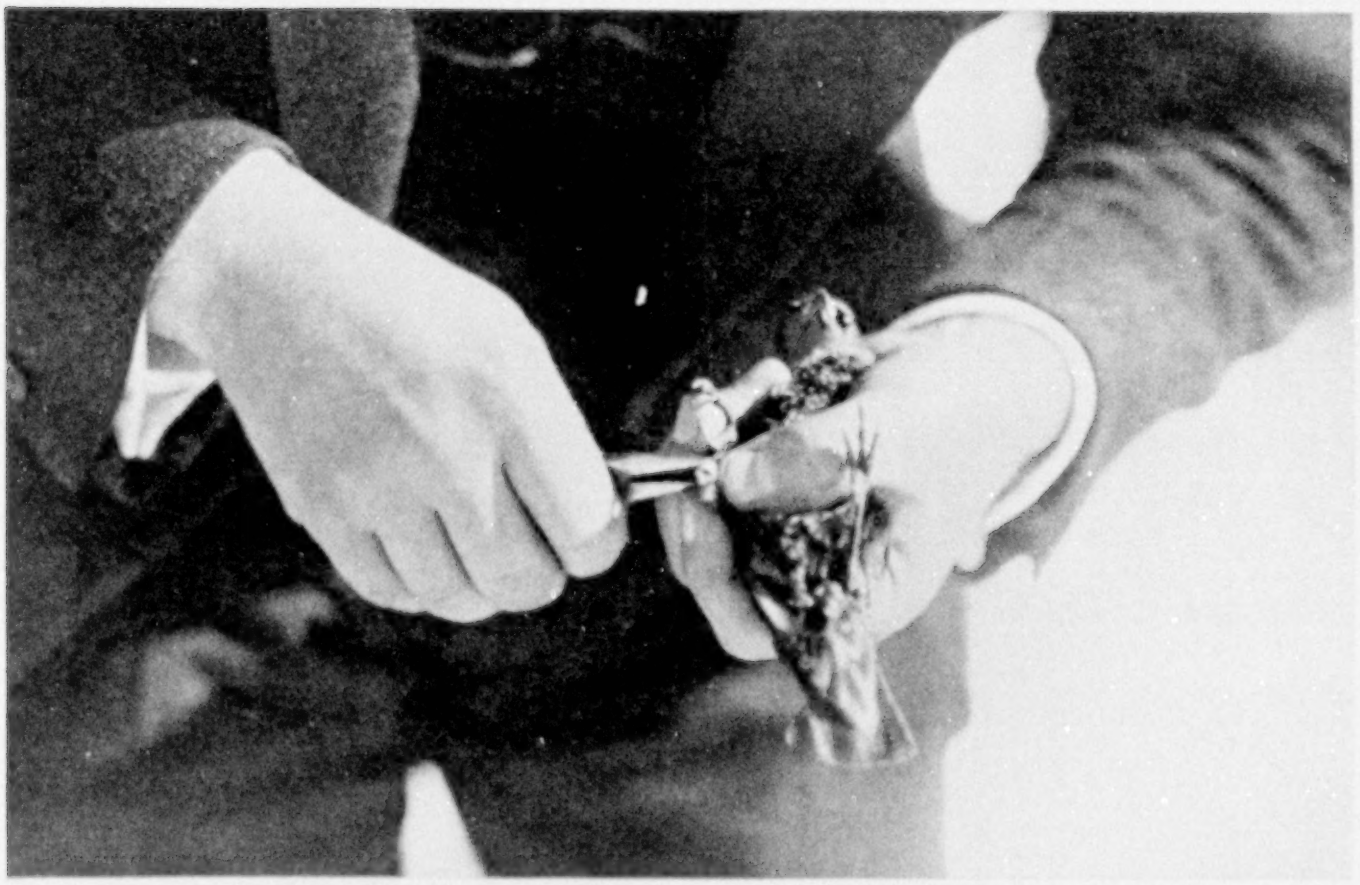
It is not until their third year that the Bald Eagles acquire the characteristic white head feathers that give them their name. They are nearly black the first year and quite gray the second. Even a young one is strong enough to require the services of three men to band it.



Photograph by R. D. Sloane

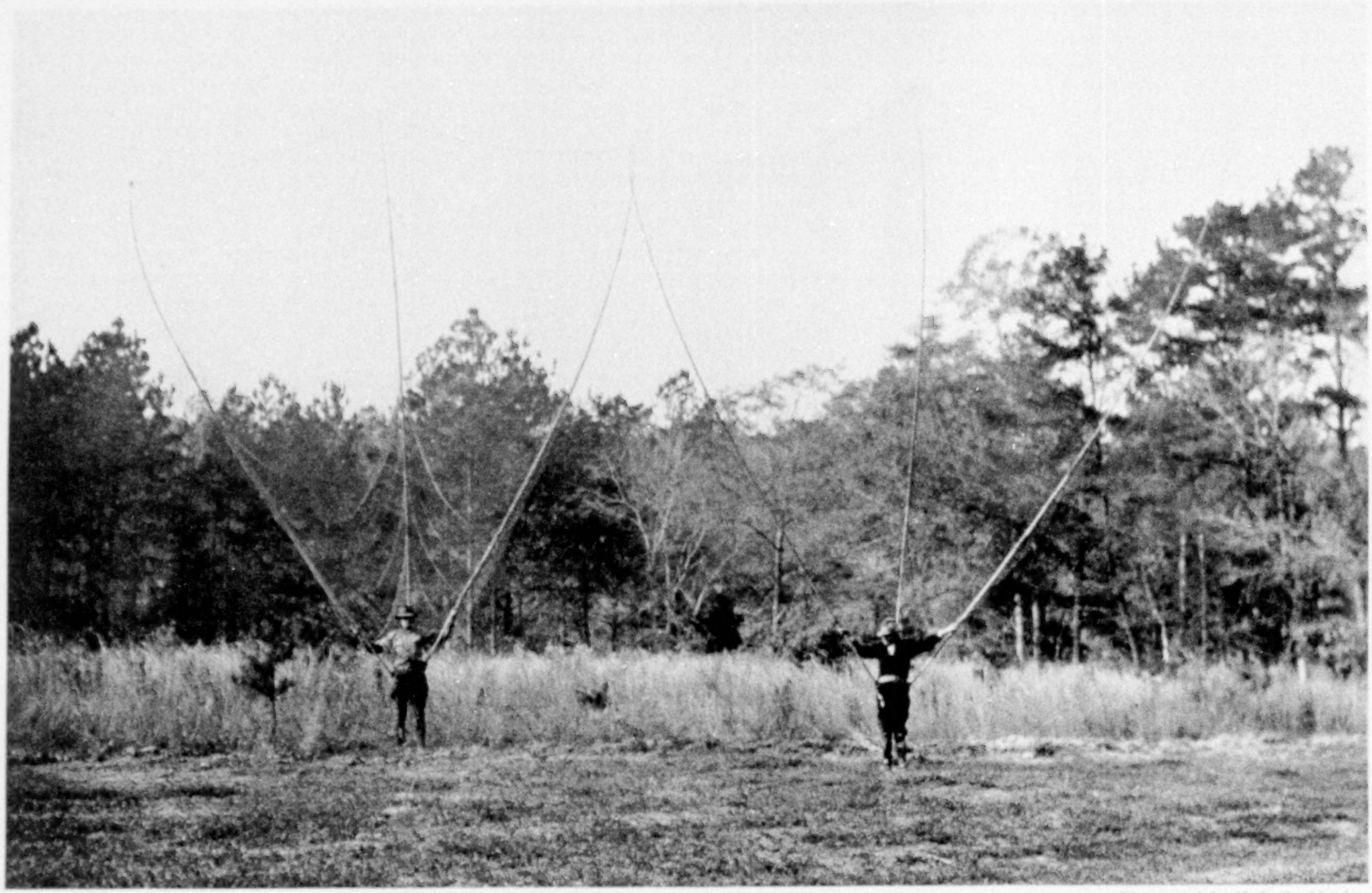
FEATHERED CITIZENS OF THE AIR FIND SANCTUARY HERE

This bird refuge of Kingsville, Ontario, has become a favorite resort for Wild Geese and other migrating flocks (see text, page 95). They know where they are safe and fly up well out of reach of gunshot before venturing off the protected property of the sanctuary.



PLACING A BAND ON A STARLING

Hardy and pugnacious, the Starling is well fitted to care for itself in the struggle for existence. Although its ancestors came from Europe less than half a century ago, it has spread rapidly through the north and middle Atlantic sections and threatens to become a real pest.



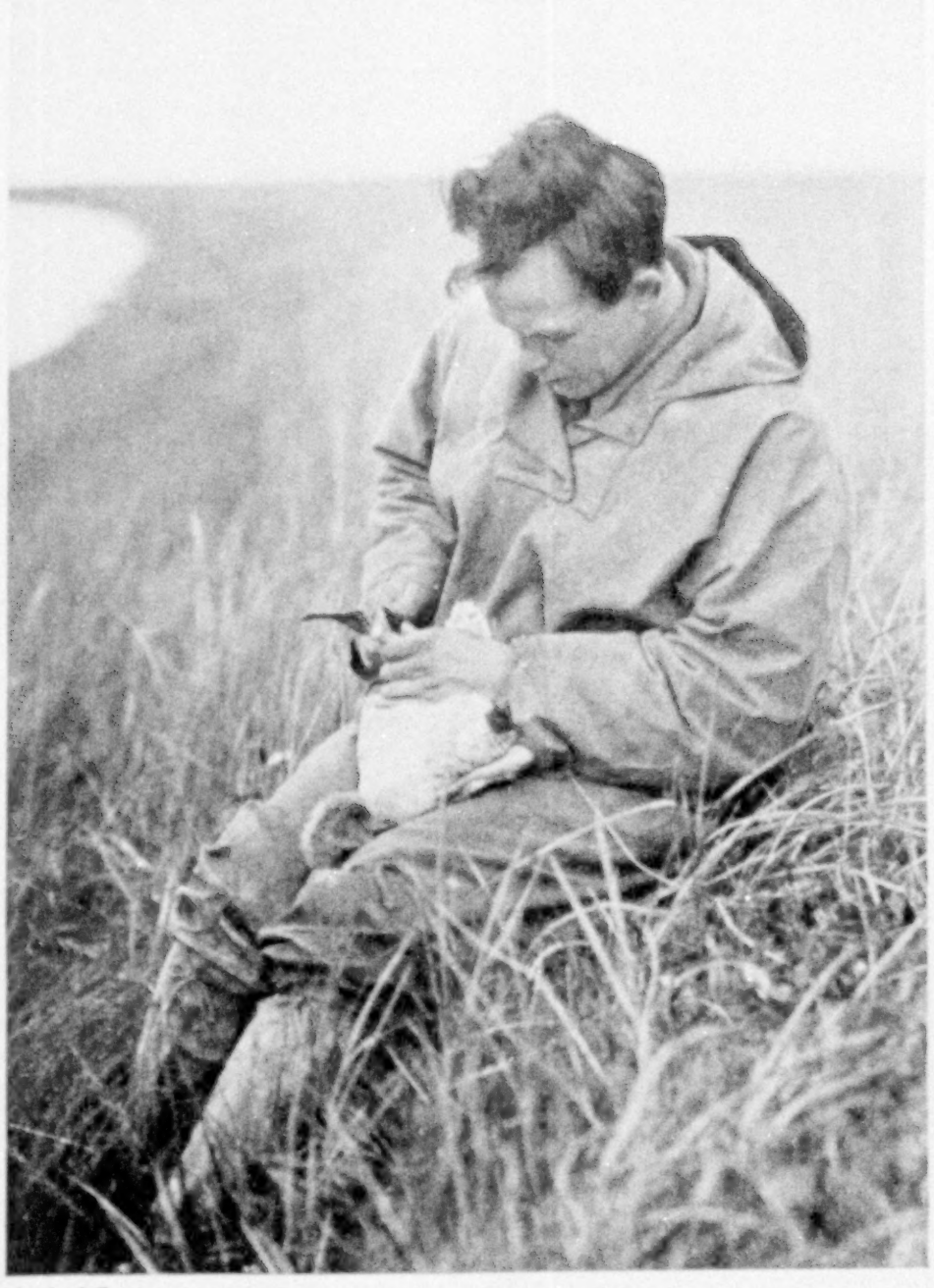
Photograph by H. L. Stoddard

NOT MEMBERS OF A BUTTERFLY BALLET; JUST QUAIL HUNTERS

One of the unique instruments used to capture birds for banding is the clap net. Bamboo rods rise from sockets in the operator's belt and spread the net. The two side rods are then swept forward and close like wings, thus entangling birds flushed from the ground or low trees.

A NIMROD OF THE NORTH

With amazing skill, Eskimo boys of Alaska spear the Emperor Geese, from whose skins are made "parkas" (outer garments). Their crude thrower makes it possible to propel a spear much farther than could be done by the hand alone.



PUTTING HIS "TRADE-MARK" ON AN EMPEROR GOOSE

The most beautiful and least known of the Geese summering in the Far North, the Emperor is only a very occasional visitor to the United States in northern California. A peculiarity of the species is the low altitude at which they often fly.

Photographs from U. S. Biological Survey

Photograph by R. D. Sloane

THE FRIENDSHIP OF WILD GEESE BEING SUCCESSFULLY CULTIVATED

territory in North America north of Mexico. They have secretaries to keep in touch with the members and to promote their activities.

In addition, these organizations hold annual meetings and publish bulletins and other matter concerning the work. A mass of new information about our bird life is being built up, and the solution of many long-standing mysteries in their movements and habits appears to be near.

BIRD BANDING WILL APPEAL TO ALL BIRD LOVERS

As bird lovers, a host of members of the National Geographic Society will be interested in this new form of bird-study. It has already yielded rich results and promises much for years to come. More people in the United States than in any other part of the world have a real interest in bird life, the numbers running into millions.

In the eastern United States numberless people are familiar with the swarms of graceful and beautifully colored Warblers and other small birds that move northward through our forests in the spring. Earlier in the season, over the entire breadth of the continent, lovers of wild things have their pulses quickened by the thrilling sight of flocks of Cranes, Geese, and Ducks sweeping high across the sky, toward the waters in many a remote northern solitude.

By the human eye alone, it has been impossible to determine that the birds occurring in a locality at different periods are the same individuals that have resided there through the season. Neither has it been possible to distinguish the males from the females in Song Sparrows, House Wrens, and various other species in which the sexes are alike in color. Through banding, these questions can be answered, and also the relations of the individuals of the species to their environment.

Do the representatives of a species that breed in a certain locality remain throughout the year, or is there a shifting of the bird population? At one place in Pennsylvania, Song Sparrows resident there during the winter left in March or April and were replaced by the summer residents, which in turn disappeared on the approach of autumn. No banded Song Sparrow captured there in midsummer

Photograph from U. S. Biological Survey

THESE CAPTURED MALLARDS WILL RECEIVE BIOLOGICAL SURVEY BANDS

was taken in midwinter, and no midwinter bird has ever been taken in summer.

There is good reason to believe that this shifting of individuals from one part of their range to take the place of birds that have moved farther south in autumn is a characteristic habit of many species. Within a few years the facts will be known in regard to this, both as to game and nongame birds, and this information will be of practical service in helping to solve problems of conservation.

TRAPPING IS ESSENTIAL TO BANDING

At the beginning, most of the birds banded in America were nestlings or parents taken at the nests. The first trap used was the Government Sparrow trap, devised by the Biological Survey to capture English Sparrows. With the growth of bird banding a great variety of small traps, mainly of wire mesh, has been developed through the ingenuity and experiments of those interested in the work.

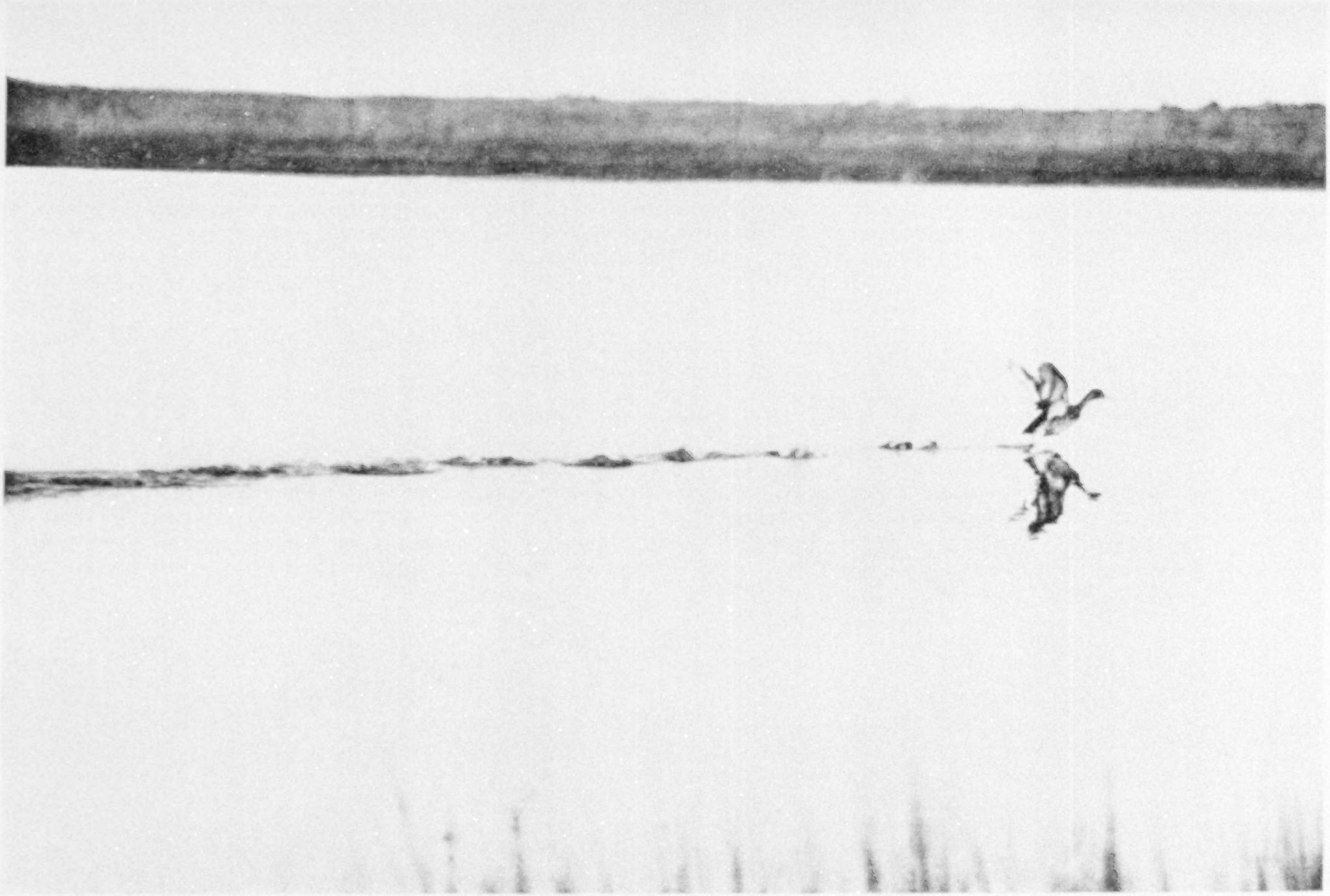
Some of these traps are automatic; others are operated with drawstrings by a watcher concealed a short distance away.

One successful form of wire trap is attached to a tree trunk. The upper and lower ends form hinged doors, which close when a long cord leading to a nearby place of concealment is pulled. These traps, baited with suet, are successful in capturing Nuthatches, Flickers, and numerous kinds of Woodpeckers.

In addition to the various traps needed for capturing birds of different habits, the matter of bait is important. The food requirements of birds vary greatly, and to take them successfully one must cater to the individual preferences of the different species, and sometimes to individuals of a species.

BIRD BANDING AIDS CONSERVATION

Experience in administering the Federal Migratory Bird Treaty Act for the protection of migratory birds has forcibly impressed the writer with the urgent need of more definite information concerning movements of such wild fowl. Especially important are data about breeding places of Ducks, Geese, and other game birds which visit our water areas each autumn and winter. Adverse conditions affecting them on their breeding grounds might seriously endanger the existence of these



Photograph by Herbert K. Job

PREDECESSOR OF THE HYDROPLANE

The Lesser Scaup, once in the air, is a high, fast flyer, but has some difficulty in rising from the water. It is a denizen of deep, cold, and preferably fresh water, and owing to a similarity in general habits, and a close resemblance, is easily confused with the Greater Scaup. The photograph was taken on Crane Lake, in the Province of Saskatchewan, Canada.

species. This is becoming more and more important in view of man's encroachment on the few remaining wild places of America, extending to include the exploitation of Arctic lands.

In order that direct efforts might be made to supply information about our migratory bird life, the Biological Survey took over the activities of the American Bird Banding Association and became a clearing house for information concerning this work.

As the majority of birds banded are migratory species protected by Federal law, it also is legally necessary that each coöperator obtain from the Department of Agriculture a permit to capture the birds. At present nearly 1,200 banding stations are in operation in all parts of the country.

The Biological Survey supplies the operator with instructions and several sizes of serially numbered aluminum bands. The operator sends the data regarding each individual bird banded to the Bureau, which has established an indexed card file of such records.

Widespread interest is expressed in reports of the capture of banded birds, of which 13,794, representing about 200 species, have been retaken, either alive or dead. When an American banded bird is taken, its band number and the date and locality in which it was found are communicated to the Biological Survey. The Bureau informs the finder of the origin of the bird, and also notifies the bander of the circumstances of its capture. The notice of capture may come from a neighbor or it may come from an American consul in some remote corner of Spanish America.

TRAPPING AND BANDING FASCINATE INVESTIGATORS

Even on a town lot, trapping and banding such wild, elusive creatures as birds have the elements of romance and adventure. These are increased in relation to the remoteness and wilder aspects of the surroundings where the work is done.

The recapture, after a long absence, of birds where they were banded is a joyful event. Since last seen the little wanderer may have visited the desolate shore of the Arctic Ocean or may have sojourned in the luxuriant tropical forests under the Equator.

Bird banding opens the door to an intimate knowledge of wild birds in a manner and on a scale hitherto impossible. It fascinates all who engage in it. Not only may definite answers be found to problems formerly unanswerable, but the investigator has the added joy of pitting his wits against those of wild things in their capture. This gives an outlet to that spirit of the chase which has come down to most of us from our primitive ancestors, and is one of its delightful but harmless manifestations, to be classed with the sport of wild-life photography.

BANDING DOES NOT INJURE BIRDS

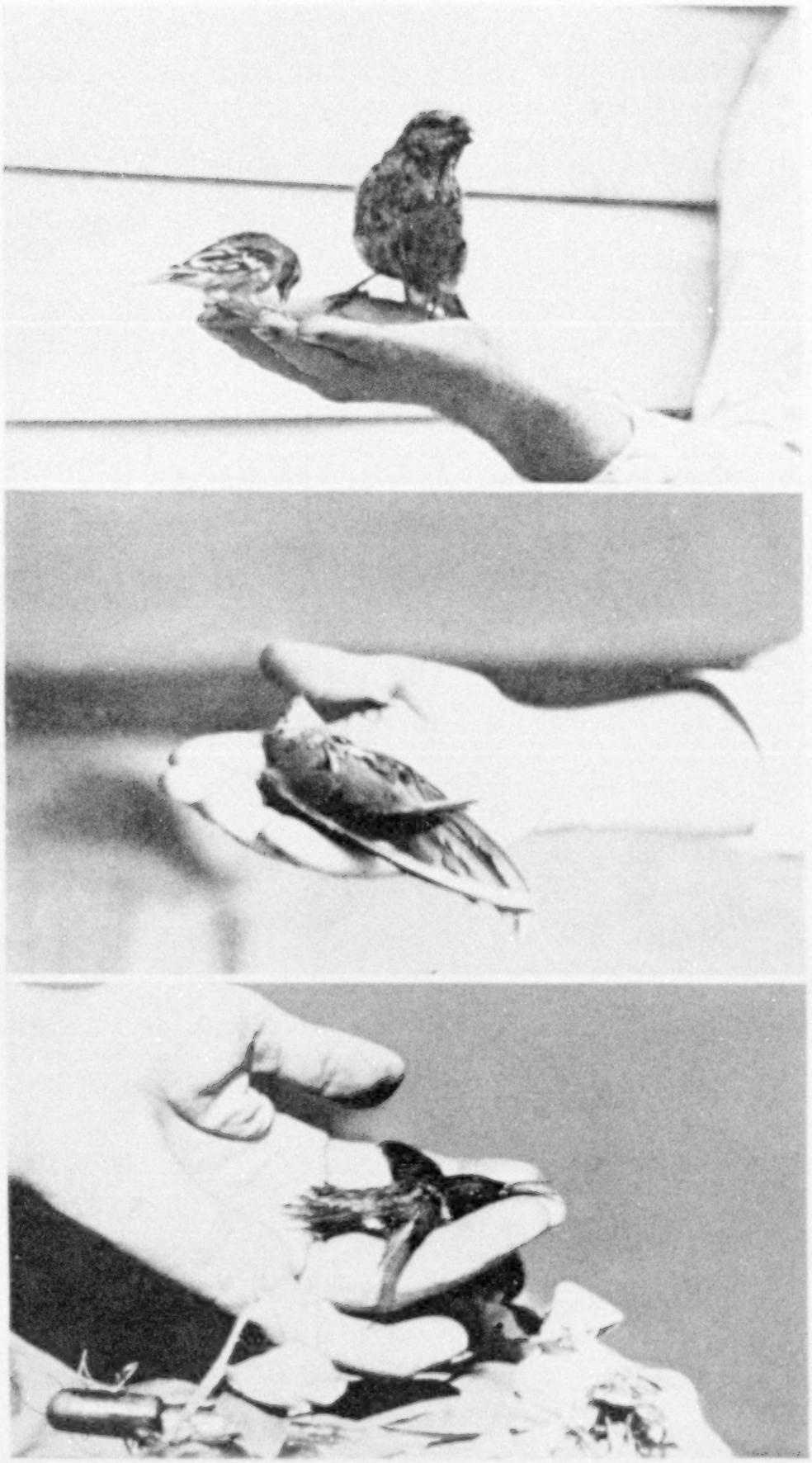
Endless opportunity is open for the improvement of traps and methods of operation, and one of the strongest appeals of all in the work is the opportunity it affords to hold in hand and become intimately acquainted with our charming woodland friends.

Experience has proved that the trapping, handling, and banding of birds neither harms nor seriously alarms them. In fact, a bird-trapping and banding station may be beneficial to birds, and serve as the direct cause of a local increase in their numbers. The supply of food continually renewed at the traps and the constant guard that is kept against the incursions of cats and other enemies render the vicinity of such stations an effective sanctuary.

Every bird bander becomes a zealous defender of his wards, and enemies soon learn that absence from his premises is the better part of valor, since trespassers often suffer death.

There is real danger to trapped birds if they are not well protected against prowling cats and dogs by a suitable guard fence or vigilant watch. Automatic traps are indiscriminate in their captures and at times take in undesirable visitors, such as red and gray squirrels, ground squirrels, small rabbits, rats, mice, house cats, small skunks, and snakes. A five-foot rattlesnake was found in a Quail trap in Georgia.

Trapping and handling creatures as delicate as birds for a time raised antagonism in the minds of many bird lovers, but the experience of one woman who is



Photograph by P. Kuntz

A MEDLEY OF BIRD POSES

The friendly confidence of birds about a banding station is well indicated by the Pine Grosbeak and Goldfinch feeding together on an operator's hand. A Chimney Swift, like the one lying hypnotized in the center picture, returned to the station where it was first banded and was recaptured there for eight years. The bird in the lower illustration is a Ruby-throated Humming Bird that has been banded, and is lying quietly in the open palm before taking flight.

an ardent protectionist is typical. At first she opposed banding as likely to be dangerous to the birds. As her interest increased, however, she began trapping and banding, with the result that she is now convinced of the harmlessness of the operation.

During his bird-banding operations Mr. Baldwin (see text, page 95) has handled trapped birds more than 40,000 times, and has had only four or five accidents.

The constant recapture of the same birds indicates that they do not consider the traps dangerous. In fact, the persistence with which certain individuals reënter traps in search of food might raise doubts in the minds of the moralists as to the dangers of pauperizing our feathered friends by the varied and appetizing banquets always to be had within the traps. Certainly life is made easy for a varied host of birds at nearly 1,200 places of entertainment in this country.

BUTCHER BIRDS MOLEST TRAPS

With the possible exception of the house cat, the Shrike, or Butcher Bird, is perhaps the most dangerous enemy of birds in and about traps at banding stations. The Common Shrike in the United States is a beautiful bird, with

gray back, white underparts, and black wings, which, when spread, show a large white patch in the middle (see page 109).

These markings, together with size, give the Shrike so much general resemblance to Mocking Birds that it is sometimes mistaken for this songster. There the resemblance ends, however, for the broad, black band on each side of the head, the hooked, raptorial beak, strong claws, and fierce courage characterize this little buccaneer.

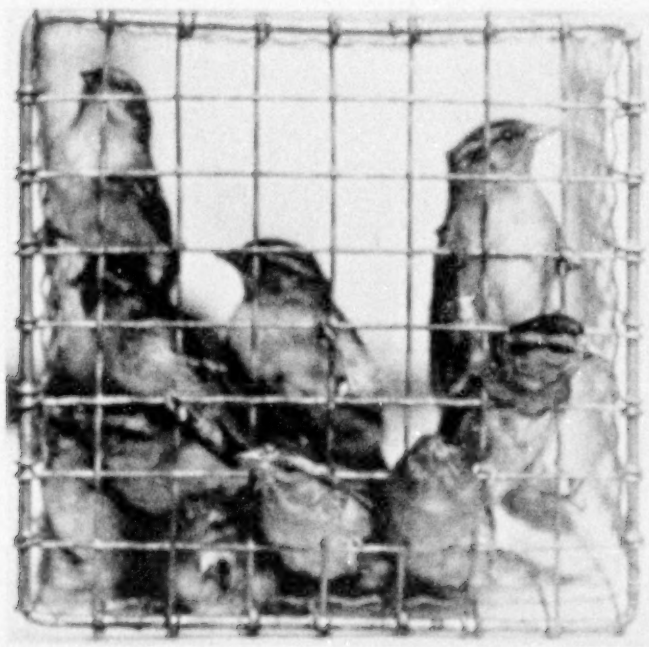
It is unquestionably a far greater destroyer of small birds than is commonly appreciated. When in the neighborhood of a banding station it quickly notices the concentration of birds there and promptly proceeds to take advantage of its opportunity.

Sometimes a Shrike even enters the trap to get at the captives. More commonly it alights on or hovers about the wire meshes of the cage, until the birds within develop an uncontrollable panic and thrust their heads against the meshes to try to escape. Then it seizes a head in its claws and promptly pulls it off or lets the bird fall back dead. Needless to say, when found about a banding station Shrikes usually have short shrift.

NUMEROUS SPECIES ENTER THE TRAPS

By establishing a series of automatic traps at the same station, which may be visited at frequent intervals, the number of birds captured in a day may vary from a few individuals to more than 200. Such captures may include a considerable variety of species. At the station near Thomasville, Georgia (see, also, text, page 95), 37 were taken one year between January and April, including such diverse kinds as the Sparrow Hawk, Mourning Dove, several kinds of Woodpeckers, Blue Jays, several kinds of Sparrows, Cedar Birds, several different Warblers, Ruby-crowned Kinglets, Hermit Thrush, Mocking Bird, and others.

Occasionally recaptures of banded birds occur under circumstances which add the zest of amusing unexpectedness to ordinary routine. A banded bird is recaptured, its number recorded, and upon release it almost immediately reënters the trap! Or the observer may find it a short time later awaiting him in a neighboring trap.



Photograph by S. Prentiss Baldwin

A GROUP OF CAPTIVE CHIPPING SPARROWS

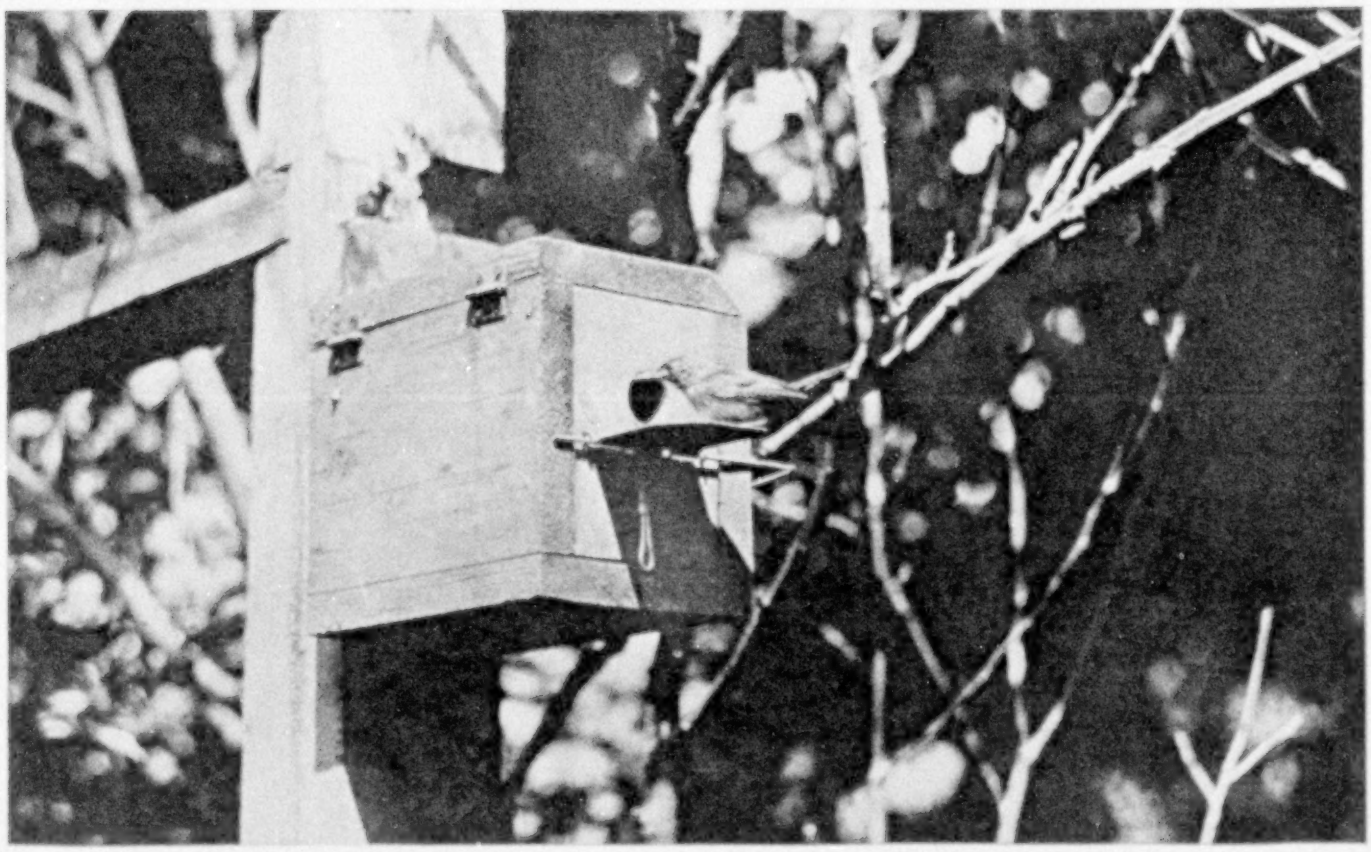
These little birds are well loved in eastern North America. They exhibit a strong confidence in the friendliness of man and seem to prefer to be around or near his habitations.

As a result of the abundance of food and protection from harm, many small birds get the trap habit. Brown Thrashers usually dash about trying to escape, but one of these birds which was captured at intervals during five different years at the Thomasville station became so trapwise that eventually he came to consider one trap as his headquarters. Sometimes he took his noon siesta in it, with his head turned back on his shoulders, and had learned to find his way out of the Sparrow traps when he had satisfied his hunger.

On one occasion this bird was taken two miles away to be photographed, and then liberated. Eight days later he was back at the trap. His sense of ownership was so great that he persistently drove other birds away, and finally had to be removed so the trap might function. He was carried off and liberated so far away that he did not return.

TRAPS USED AS SUMMER RESORTS

One Chipping Sparrow at Thomasville was caught in the same trap 54 times during one season. A Fox Sparrow has a record of being caught 165 times during one winter. At Crystal Bay, Minnesota, a Song Sparrow entered and was taken from the trap 55 times between April 14 and 30; in May it was caught 106 times;



Photograph by S. Prentiss Baldwin

HOUSE WRENS ARE WELCOME NEIGHBORS

Cheery and friendly, these sprightly little songsters will nest near a human habitation whenever given any encouragement. A wooden box or an old tin can with a hole small enough to exclude English Sparrows will serve as a home for Mr. and Mrs. Wren.

during the first four days of July, 14 times. After an absence it returned July 8 and in the following ten days it was caught 47 times. On July 17 it was carried half a mile away and in 20 minutes was back in the trap from which it had been taken. The following day it repeated this performance six times and twice on the 19th, after being carried off and released at a distance of two miles.

At Thomasville a pair of Myrtle Warblers developed the trap habit and were retaken 30 times during each of two seasons, both birds usually being in the trap together.

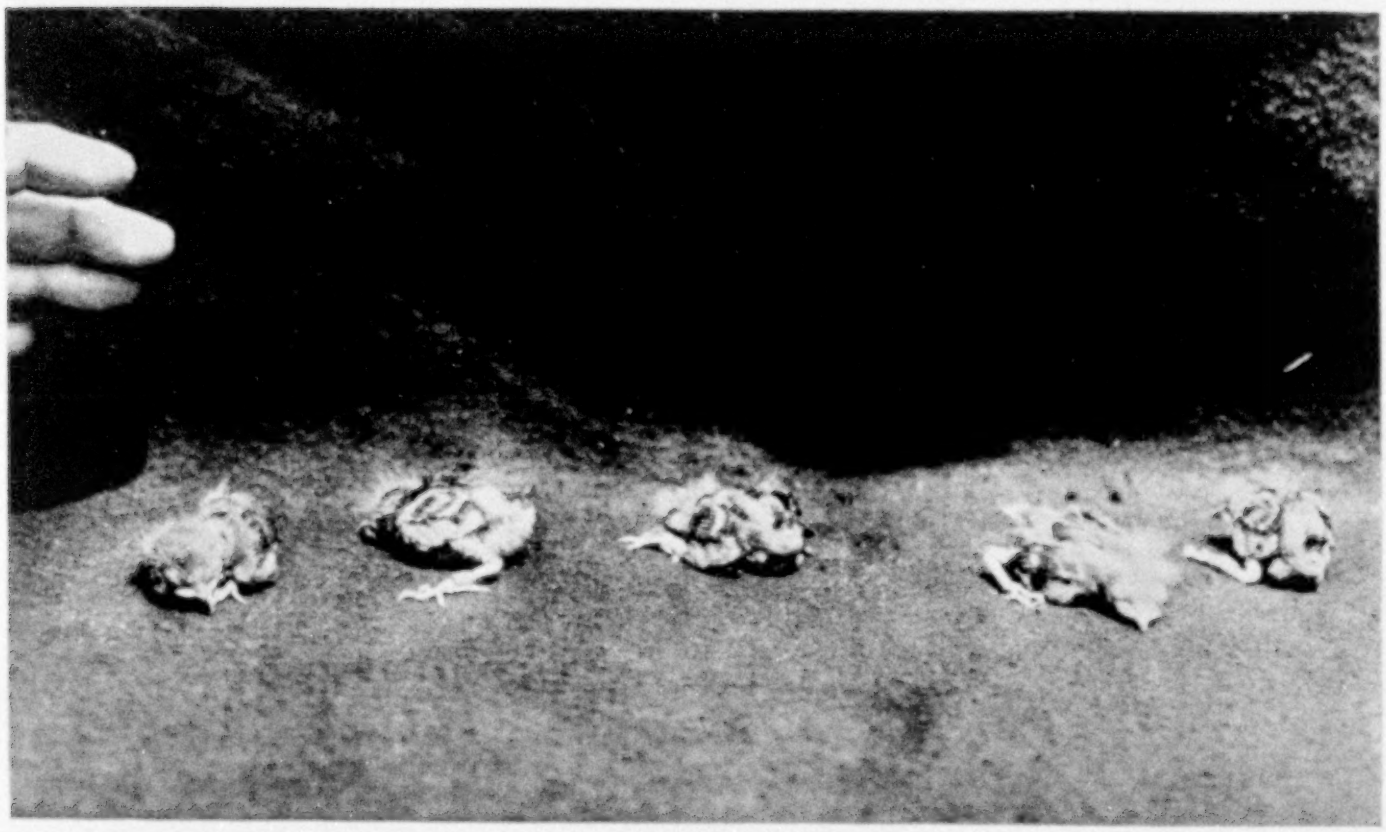
Sparrows and most other seed eaters are ground feeders. Traps placed in spots they frequent are usually successful, but even Sparrows may discriminate and not enter a trap placed in a seemingly proper spot, although they will enter it readily when it has been moved to a location only a short distance away. At other times one of a pair will freely enter the trap, while its mate persistently avoids it.

The capture of various Woodpeckers and other tree-climbing birds presents a different problem, and traps for them must be attached to the tree trunk and baited with a different kind of food. Varying food preferences of birds call for all the knowledge of the operator on the subject. In one instance much effort was spent in unsuccessful attempts to capture Cedar Birds until pieces of apple were tried for bait and the problem was solved.

RESULTS SURPRISE BIRD BANDERS

The variety of species that may be trapped explains much of the interest in bird banding. An operator at Sault Ste. Marie in 1925 trapped and banded more than 2,000 birds, representing 32 species, 13 of which were Warblers. All were captured within 50 feet of his dining-room window.

At a station in Pasadena, California, 1,984 birds of 38 different kinds were trapped. Surprising numbers of species of Warblers, with most diverse habits, have been captured and banded, including the lovely Prothonotary, the Black-throated Blue, the Nashville, and the exquisite Blackburnian. Several species of Vireos have also yielded to the call of the



Photograph by S. Prentiss Baldwin

BORN INTO "BANDAGE"

These baby House Wrens were banded before they were ten days old. There appear to be no set rules governing family relations among Wrens. Sometimes the male remains and assists his mate in feeding and caring for the young; at other times he promptly deserts his family.

bait in traps and have departed carrying their identification bands.

THE HOUSE WREN IS INCONSTANT

It has been the common belief of numerous bird lovers that many, if not most, birds mate for life. When an observer notes the arrival of a nest-hunting pair about a box or other breeding place that was occupied by birds of the same species during the previous season, he usually assumes that these are the identical birds of the previous year, and thus the marital fidelity of our feathered friends comes in for commendation.

So far as the House Wren is concerned, Mr. Baldwin's observations of banded birds wreck this beautiful myth. He proves that not only do these birds commonly change their mates at different seasons, but that the female Wren may divorce the mate with whom she raised one brood in spring and rear another brood the same season with a different mate. The male in such case promptly consoles himself with another charmer and rears his second brood, frequently in a closely neighboring nesting place. At other times the male is the unfaithful one and departs with a new mate.

These observations are based on the repeated recapture of banded birds on their nests, with records of their numbers made each time. In one case a mated male apparently became interested in another female, but before the affair reached the serious work of actually rearing a second brood, he returned and resumed his duties with the mate with whom he had reared the first brood that season.

Owing to rematings among Wren families, it is a complicated process to keep track of their relationships. An accurate record of three generations of House Wrens in one limited locality needs the services of a skilled genealogist.

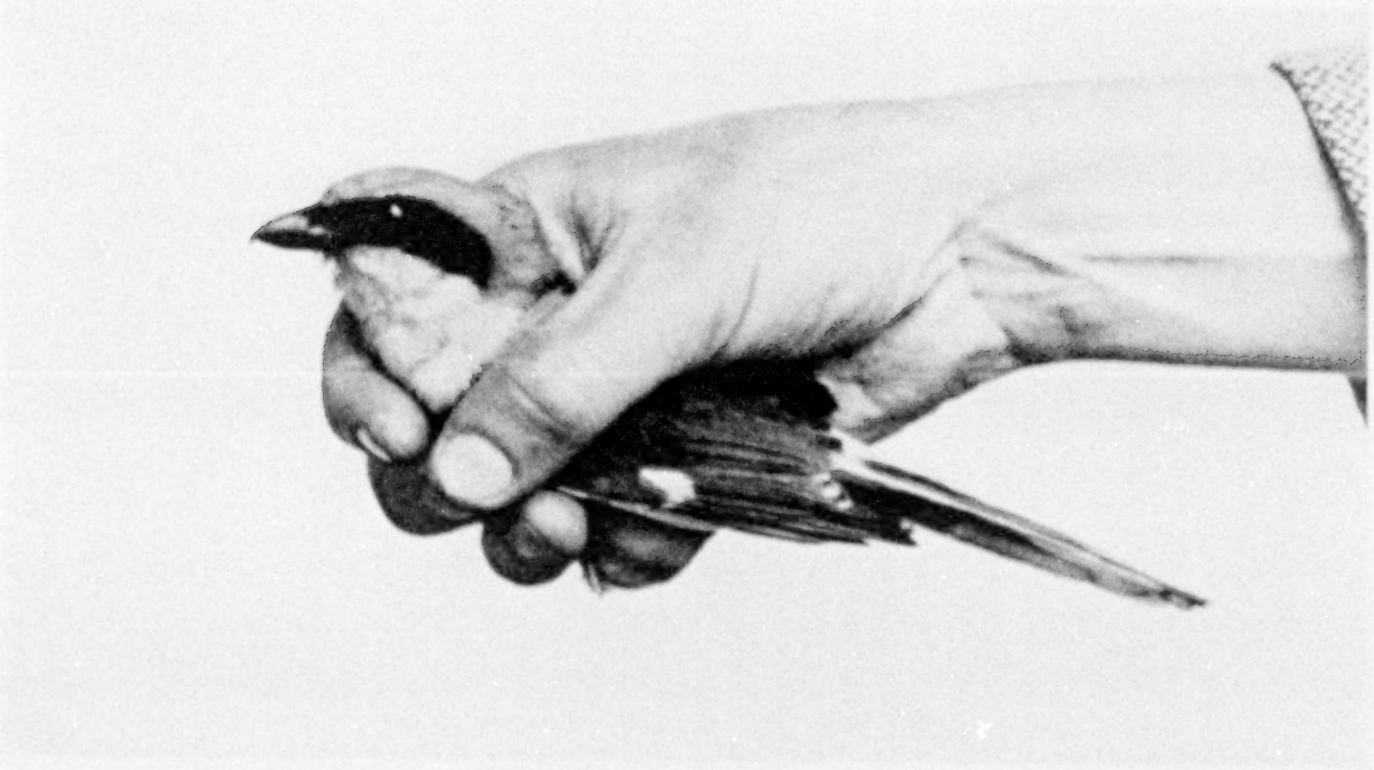
WRENS DO NOT OPPOSE DIVORCE

No evidence of polygamy has been found among House Wrens, but they appear to have a modern conception of divorce. Sometimes they remate a second season, but not often. More frequently they remain mated for a second brood the same season. Apparently still more frequently a new mating takes place after the first brood is reared.

Photograph from Francis H. Herrick

"JOVE'S BIRD" NESTLES NEAR THE SUN

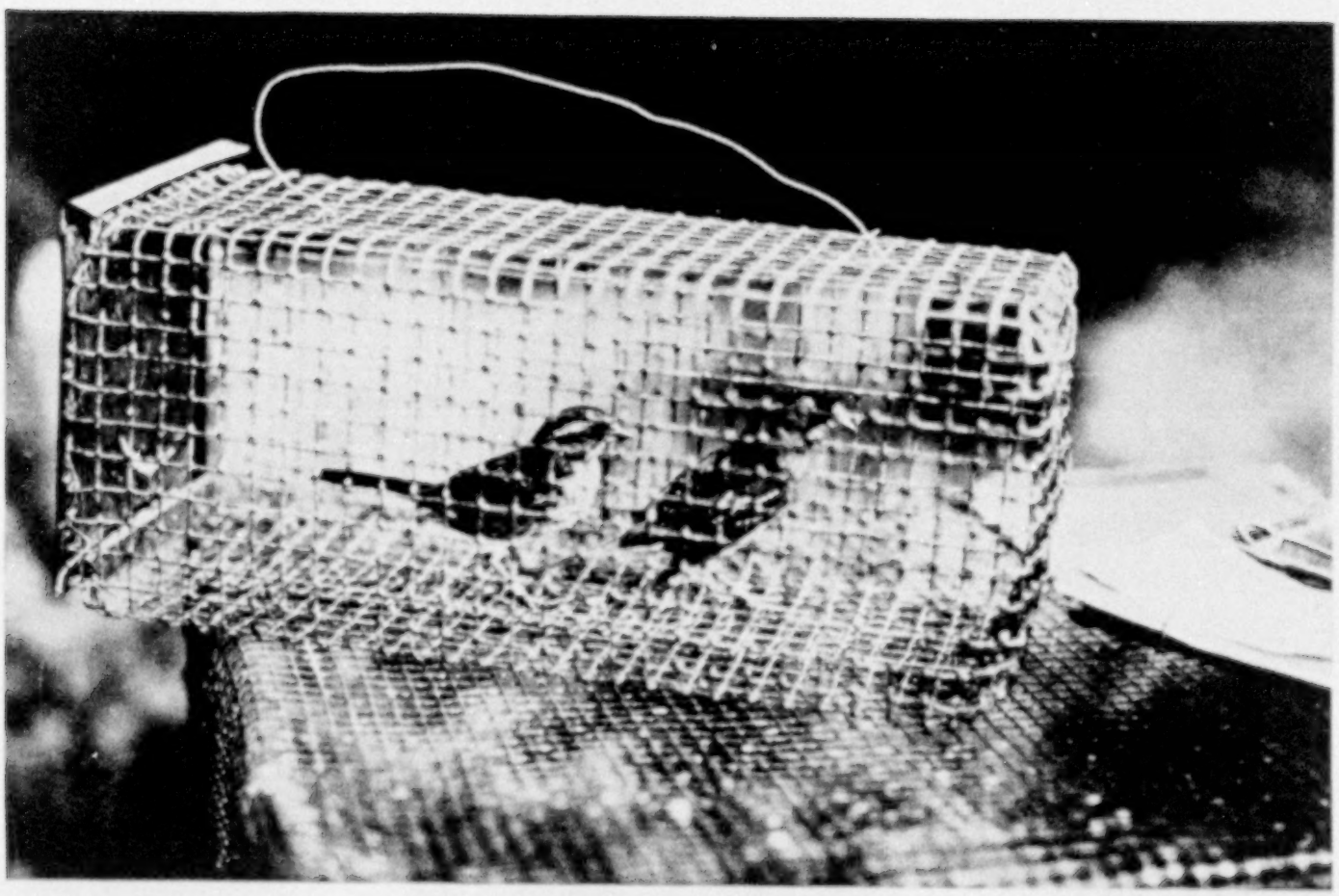
Perched high in the top of an old tree or on a ledge of some precipitous crag, the Bald Eagle builds his eyrie. It is his castle, to which he adds year after year, and where successive generations of Eaglets are reared.



Photograph by S. Prentiss Baldwin

THIS MASKED MARAUDER IS A FIERCE DESTROYER OF SMALL BIRDS

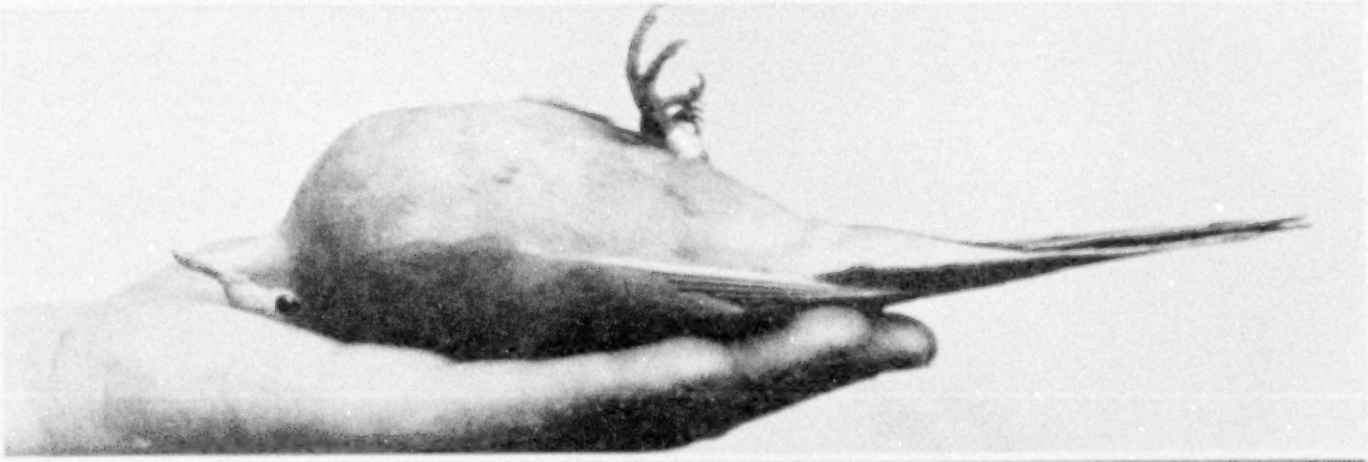
The Shrikes are, perhaps, better known as "Butcher Birds," and they well deserve the name. Voracious feeders, they live on small birds, mice, small snakes, lizards, and insects. They frequently kill more than they can eat and hang the surplus on a convenient thorn bush.

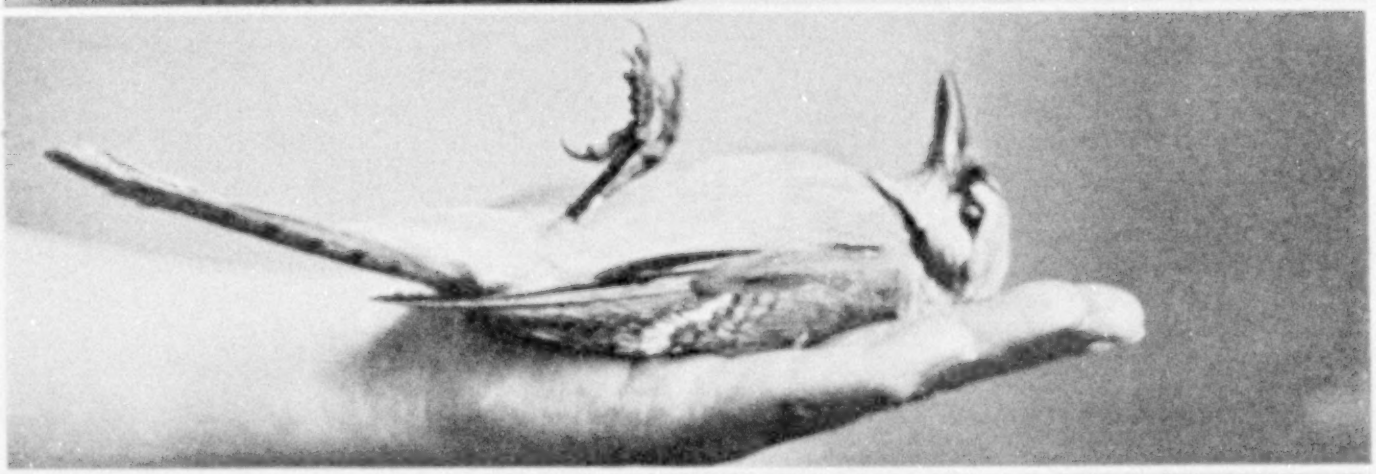


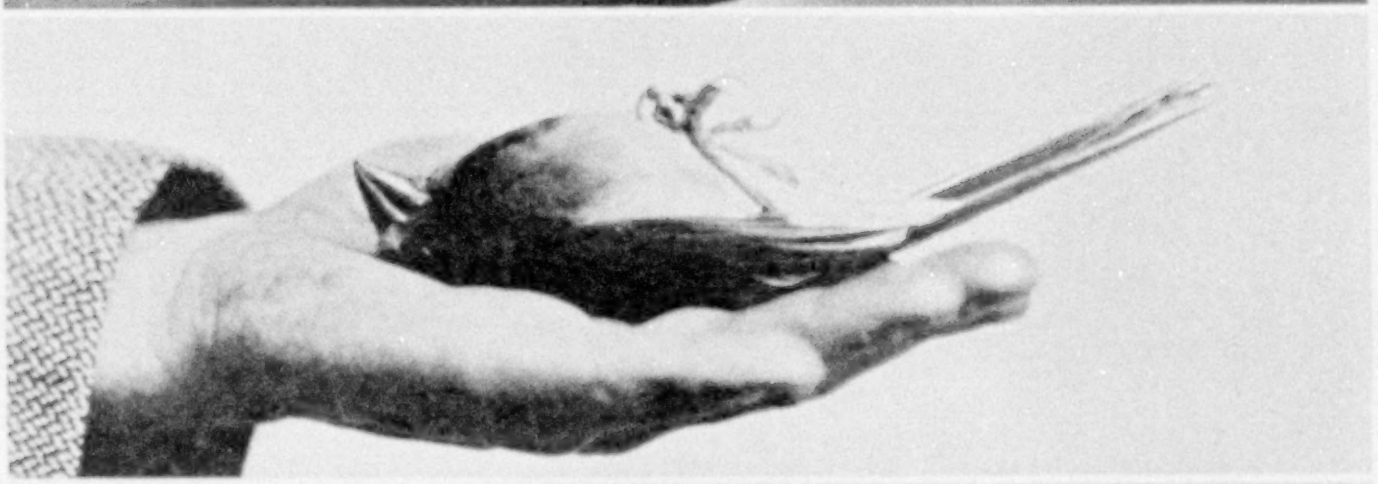
Photograph by J. W. Stack

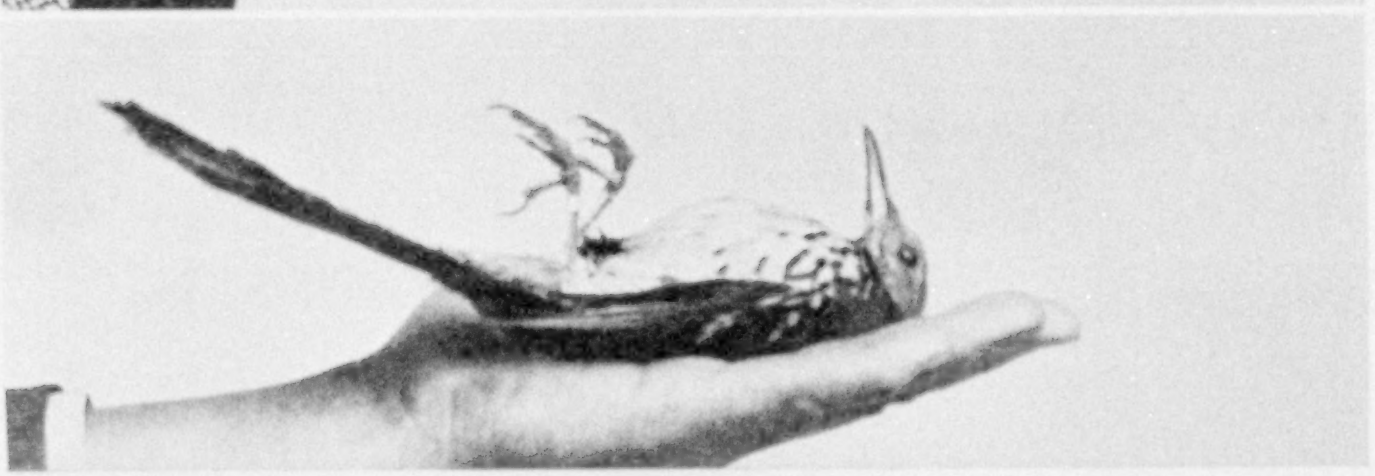
TWO WHITE-THROATED SPARROWS AWAIT THEIR BANDS

Although among the sweetest and most plaintive of singers, the "White-throat" is not too well known, for his favorite summer haunts are in northern forests. His voice is not his only claim to distinction, however, since he is also one of the handsomest of the Sparrows.









Photographs by S. Prentiss Baldwin

HYPNOTIZED, OR JUST "PLAYIN' POSSUM"?

When held in the hand for a short time and then turned over on their backs, birds appear to be affected hypnotically. Practically all species react similarly, but some are slower than others in becoming quiescent. They remain quite rigid for from a few seconds to several minutes and then dart away. From top to bottom, the birds shown here are a Mourning Dove, Blue Jay, Cardinal, and Brown Thrasher (see text, page 116).

The detailed accounts of the family affairs of the House Wrens at Hillcrest, Ohio, give a good idea of the information that can be gathered through bird banding. Similar methods can be used with other species, although not usually to so great advantage, owing to the number of pairs of Wrens that nest in this limited area.

At Hillcrest, the male Wrens usually arrive in advance of the females in spring and each locates what he considers a satisfactory nesting box, in which he places the foundation for a nest. He then guards the premises, singing at intervals while awaiting the arrival of the females. They appear soon after, and seem to give more weight to choice of location and character of the nesting boxes than to choice of husband. This was shown conclusively in one series of observations.

Photograph by S. Prentiss Baldwin

THIS CARDINAL IS HOLDING MORE THAN HIS OWN

Trapped Cardinals often squeal shrilly when they are approached and if taken in hand fight vindictively. In the instance photographed the bird was so absorbed in punishing its captor that after being banded and freed it hung on to the finger it was biting for sometime without any effort to escape (see text, page 116).

For two or three weeks a male occupied a nesting box, No. 53, on the outside wall of the library at Hillcrest. One morning he sang with unusual vigor and showed great excitement. A female was examining his nest box. At 7 a. m. the trapdoor of the box was closed and the band on the leg of the captured female was read.

Four hours later, when the observer was passing nest box No. 47, attached to the walls of the garage, its male proprietor showed similar excitement over a female that was going in and out of the box and otherwise indicating that she was inspecting the premises. She was trapped and her band proved her to be the same bird noted earlier in the morning at box 53.

At 4 p. m. the same day she was caught at nest box 49, halfway between the other boxes, where she was examining the premises held by a third male. By the next morning she had settled down contentedly and begun her honeymoon with male number four at box 26, attached to the outer walls of the sugar house. This was the final choice and there she raised her family.

There appears to be no set rule governing family relations among Wrens. Some-

Photograph from U. S. Biological Survey

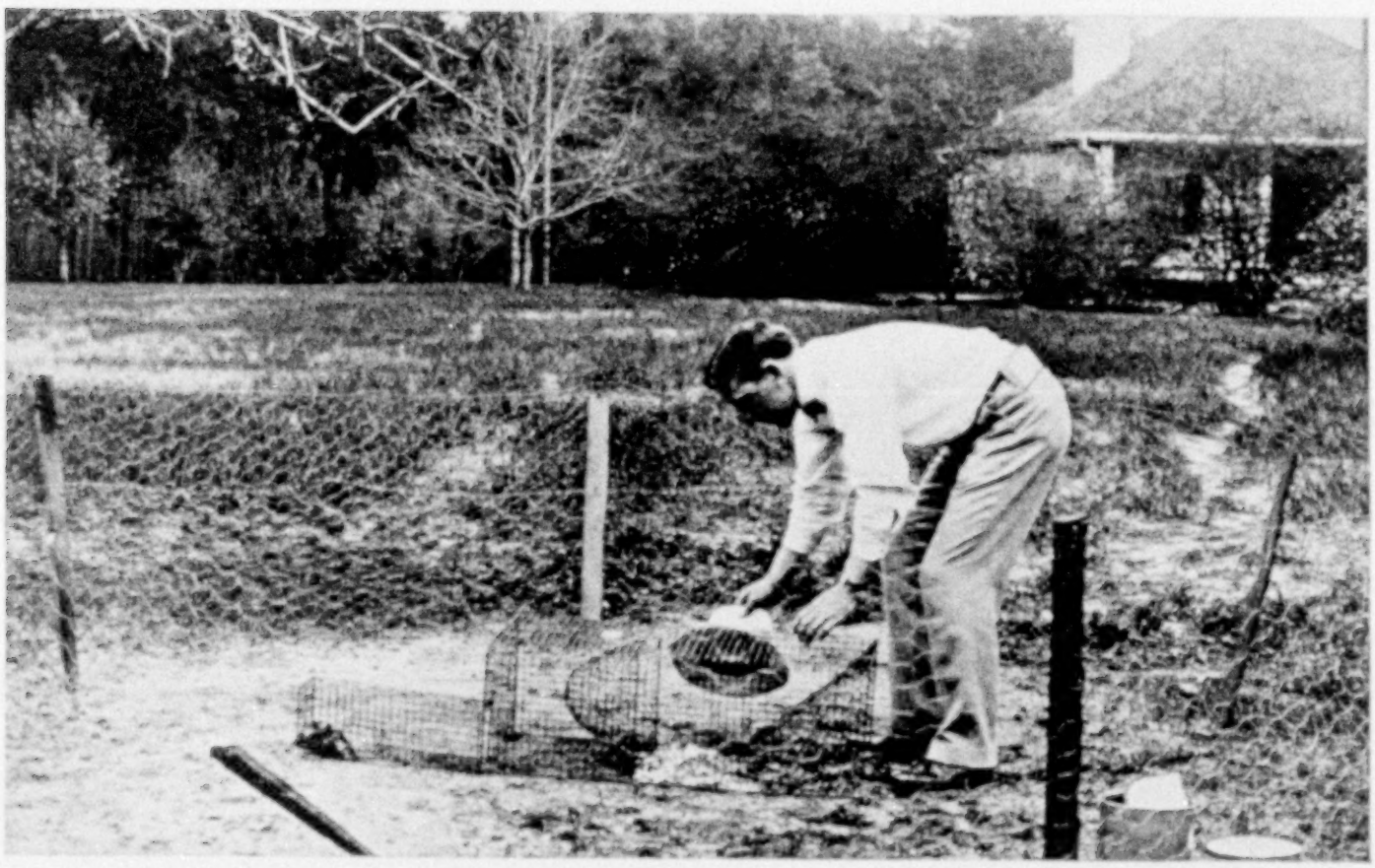
A BIOLOGICAL SURVEY SHELTER FOR BANDING YOUNG HERRING GULLS

As a result of the bands placed on Gulls in northern Lake Michigan, their wanderings have been traced to the mouth of the St. Lawrence River, down the Atlantic coast, the Mississippi Valley, and into central Mexico.

Photograph from S. Prentiss Baldwin

"A BIRD IN THE HAND"

Experience in bird banding has developed a technique of handling that is easy for the bird. The method shown here was developed by an operator who has handled birds more than 40,000 times. The bird is a Towhee.



Photograph from S. Prentiss Baldwin

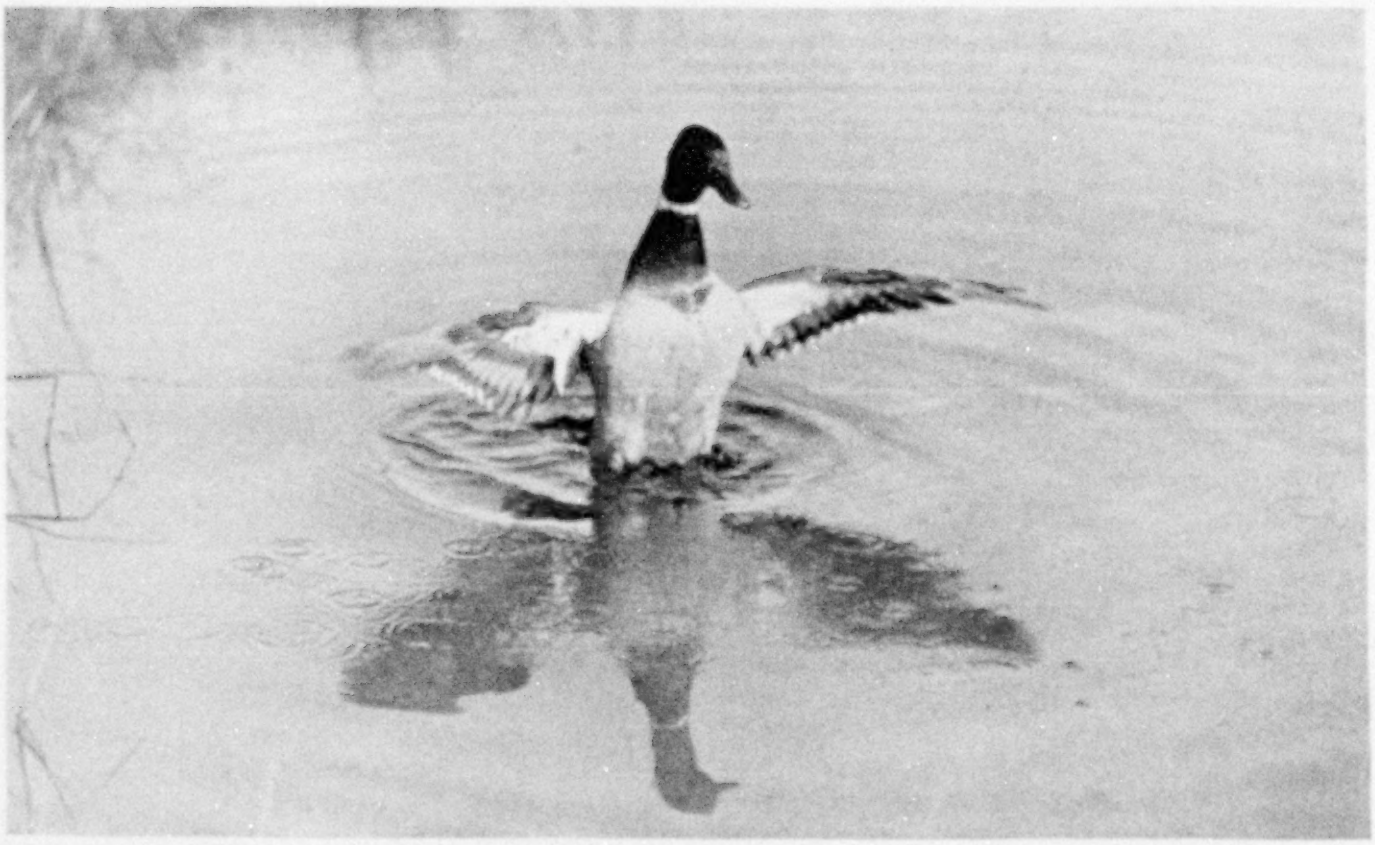
AN AUTOMATIC TRAP THAT WORKS

Mr. S. Prentiss Baldwin (see text, page 95) is driving the birds into a small "gathering cage," which enables the bander to take the birds in hand without the difficulty and danger to them that are attendant on their seizure in the traps.

Photograph from U. S. Biological Survey

GIVING BOBWHITE A FREE BRACELET

This trap, which was designed especially for taking Bobwhites, has a layer of cloth placed several inches below the wire top in order to prevent the birds injuring themselves in their efforts to escape. Mr. Herbert L. Stoddard is shown banding one of his cheery little neighbors.



© W. J. Jaycock

TREADING WATER, MALLARD FASHION

Occasionally, after swimming about on the surface of the water for a considerable time, these Ducks stand erect for a moment and fan their wings rapidly, apparently for the same reason that people yawn and stretch after sitting long in one position.

Photograph from U. S. Biological Survey

MALLARDS AND PINTAILS IN A WIRE-MESH TRAP SET ON THE ICE

Pintails are trimmer than most other Ducks, with longer, slimmer necks and a more elegant and dignified carriage. They are extremely shy and quick to take alarm and, not possessing any great degree of curiosity, they are not easily fooled by decoys. This baited trap was about 100 feet long and in one day caught 414 Ducks.

Photograph by W. J. Jaycock

A HAPPY FAMILY OF MALLARDS

Probable ancestor of the common barnyard Duck and most numerous and popular of our American "quackers" is the Mallard. Feeding almost entirely on vegetable matter and with a special penchant for wild rice when available, it constitutes food par excellence.

times the same pair remain united and raise two or three broods in a season. Again, they remate indiscriminately. Ordinarily, only two sets of eggs are laid and two broods raised, but if one set is destroyed a third may be laid. Sometimes the male remains and assists the female in feeding and caring for the young; at other times he promptly deserts the family.

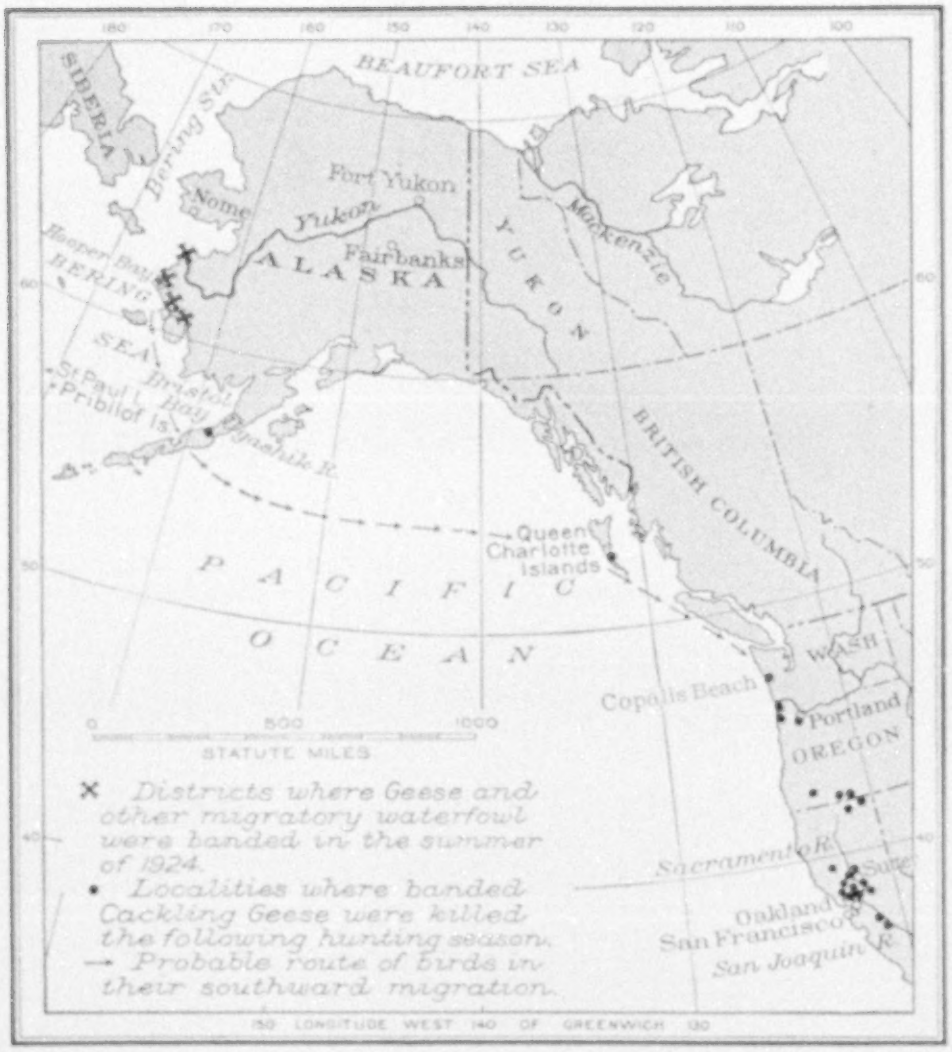
One remarkable outcome of these studies of Wrens during a period of years is that not in a single instance has any mating between parents and their banded young occurred. Father and son occasionally take the same wife at different times, but apparently there is no mixing of close blood relatives. This is an unexpected situation, in view of the general mixing up of the individuals of the species in areas where they are as plentiful as at Hillcrest.

What becomes of the surplus young hatched in a locality is still an unsolved problem. Comparatively few of the young Wrens banded at Hillcrest are retaken in succeeding years. Observations of the banded birds indicate that, as soon as they leave the nest, the mother leads them off to a considerable distance instead of keeping them about the vicinity where they were hatched.

This may be Nature's method of insuring the dispersal of the increase and preventing undue accumulation of individuals in one locality. The abundance of birds in any area commonly depends upon the food supply, and if the young were all to return to the vicinity of their birthplace the evils of overpopulation would soon arise. The fact that most birds appear merely to hold their own year by year, while they rear each season broods totaling from 6 to 12 among the Wrens, gives an idea of the heavy mortality suffered by them.

BANDING ALARMS BIRDS VERY LITTLE

Among the interesting results of bird banding is the light that intensive work has thrown, not only on the mentality of different species, but also on differences among individual members of the species.



PROBABLE SUMMER MIGRATION ROUTE OF ALASKA GEESE

The birds' reaction to being caught and held in the hand and often having a band fastened to one leg shows that they are little alarmed. When released they frequently fly to the nearest branch, where they sometimes preen their disarranged plumage or break into song.

In one instance a Wren flew to a branch a few yards away, where it quickly spied, caught, and ate two small caterpillars. Chipping Sparrows are usually silent, but some utter a fine shrill squeal when taken in the hands, and others keep up a talkative series of chattering notes. A Towhee caught 30 times at Thomasville had the amazing habit of bursting into full song whenever taken in hand and continuing until released. One Myrtle Warbler that was trapped six times invariably squealed from the moment it was caught, although not one of the 200 others of its kind taken in the same way made the slightest outcry.

Cardinals usually squeal when the observer approaches the trap in which they are confined. They fight viciously, pecking and biting the fingers that hold them. One Cardinal was so engrossed in the fray that, when the hand was opened to free him, he gave a last and especially vigorous bite to one of the fingers, then flew to a small tree a few yards away and broke into lusty song, evidently rejoicing at having defeated and escaped the enemy (see page 111).

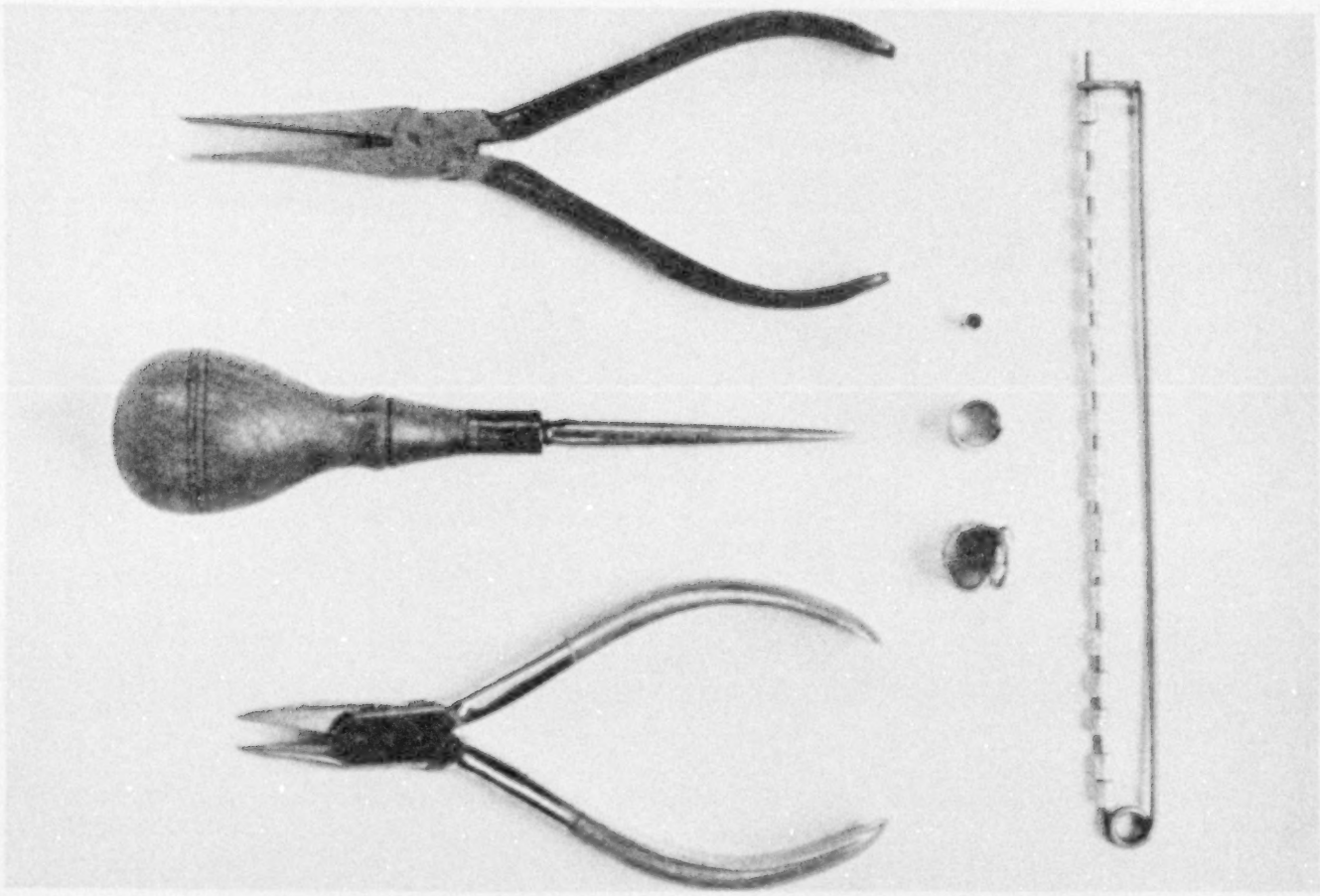
Occasionally, however, one remains perfectly quiet and passive, and when released appears undisturbed by the experience. At times even such seed eaters as Chipping and White-throated Sparrows are belligerent and peck at the hand holding them.

The individual bird that shows unusual mental characteristics of any kind always gives the same reaction when caught at other times, even when a year has elapsed. Woodpeckers and Blue Jays fight viciously, but, like other small birds when released, show little alarm and commonly alight near by, resuming their affairs as usual.

BANDED BIRDS "PLAY POSSUM"

One mental trait appears common to practically all species of birds being trapped. When held in the hand for a short time and then turned on their backs, they usually lie quietly with closed eyes, often for several minutes, on the open palm. Then like a flash they turn and fly off. The various species show a marked difference in the readiness with which they yield to this apparently hypnotic state, and a dissimilarity in this also appears between individuals of the same species.

Chipping Sparrows are probably the most willing to take this pose. Not only will a single bird lie in this manner, but



Photograph from U. S. Biological Survey

THE BIRD BANDER'S TOOL KIT

Equipment for banding birds includes one of two forms of pliers, a small awl to thrust into and open a band when needed, and a set of serially numbered bands to fit the legs of birds of different sizes. A strong wire, bent into the form of a long, slender safety pin, is very useful for stringing the bands in their numbered sequence, so the next in the series is always available. These bands bear on the outside the words "Notify Biol. Surv.," below which is the number. On the inside of the band are the abbreviations "Wash., D. C."

also two (see illustration, page 118). An instance is recorded in which four Chimney Swifts being banded were laid out side by side on their backs on a board until a gust of wind disturbed them and they were gone.

Wild Ducks remain quiescent in the same way. On one occasion a Duck was laid on its back, with its head hanging down the side of a box, while another was being banded. Afterward it was picked up and also banded.

In holding birds in my hand to induce this pose, I found that at first there was a tendency to struggle, especially at the time the bird was turned on its back. Its eyes opened and closed rapidly, then more slowly until they remained almost shut as the bird yielded. Suddenly they opened wide and immediately it darted away. Whether this is the regular course in such cases remains to be proved by further observations.

It has been suggested that the reason for this pose is that the birds' sense of balance is upset in turning them over. This does not appear to be a satisfactory explanation. Not infrequently a bird, after being held firmly in a sitting position in the hand, remains immovable with its eyes partly closed for some time after the hand is opened and it rests on the flat palm.

HOW LONG DO BIRDS LIVE?

Bird banding is yielding some vital statistics as to the life terms of the various species. The accumulation of this information will unquestionably clarify a number of points of great interest, one of which concerns the enormous mortality among birds. The vast proportion of the local birds banded are never retaken. The reappearance of only a small percentage of such birds indicates that probably a large number of those missing fell victims to the innumerable dangers that beset them.

Photograph by S. Prentiss Baldwin

A YOUNG CHARMER

The two Chipping Sparrows have succumbed to the hypnotism of being placed on their backs, but will depart very suddenly when they come out of their trance (see text, page 116). They are among the easiest species to be thus charmed. When taken in the hands, most of these birds remain silent; others squeal shrilly.

At Thomasville a Brown Thrasher was banded and recaptured for eight successive years. A Blue Jay was taken there six different years, and Wrens four years in succession. At Hillcrest a Chimney Swift has been caught in the same chimney for eight years. A Black-crowned Night Heron was taken six years after it was banded.

A Pintail Duck, helplessly sick from alkaline poisoning in the Bear River Marshes of Utah, was cured and banded by Dr. Alexander Wetmore during the autumn of 1914. Twelve years later it was killed in southeastern California, having escaped the perils confronting its kind for a longer period than is on record for any other banded bird.

BANDING THROWS LIGHT ON BIRDS AS TRAVELERS

The returns of bands from points where the birds wearing them have been captured or killed are illuminating as to the travels of individuals of the different species.

A Chimney Swift banded near Thomasville, Georgia, in October, 1924, was taken at East Kingston, New Hampshire, June 15.

A Purple Finch banded at Pasadena, California, in March, was captured far to the north, at Porter, Washington, in June of the same year. Before this it was believed that the Purple Finches frequenting the lower elevations of southern California in winter were those living during the summer in the higher elevations of the neighborhood mountains. The travels of this bird may be an indication that all the southern Purple Finches move southward each winter and are replaced by those from farther north.

A Robin banded in July at Crystal Bay, Minnesota, was taken more than a year later at Pachuca, on the southern border of the Mexican tableland. A Double-crested Cormorant banded in July on an island in Quebec was shot the following December ten miles from Lake Okeechobee, Florida, and proved to be the first record of this species in that State.

One return is of extraordinary interest. A Common Tern and 100 unfledged young of its kind were banded in 1913 on Muscongus Bay, Maine. Four years later a negro paddling a canoe on a branch of the Niger River, on the West Coast of Africa, found a strange white bird floating dead in the water, with a metal band on one of its legs. He took it to a missionary, and thus the band and the record came back to the Biological Survey.

Two Caspian Terns banded at a bird colony on Lake Michigan in 1923 were captured a year later in Nova Scotia. No doubt they had gone to the South Atlantic or Gulf coast for the winter and then joined their fellows moving up the Atlantic coast to new haunts, instead of returning up the Mississippi Valley to their birthplace. Three others banded at the same colony were recovered in Colombia, South America.

Photograph from W. I. Lyon

BEING BANDED DOESN'T SEEM TO ANNOY THIS YOUNG HERRING GULL

All Gulls fight when picked up. Grown ones continue their resistance until released, but the young ones soon cease to struggle and take their temporary captivity philosophically. Mr. W. I. Lyon, the operator, is secretary of a large bird-banding organization.

A Great Blue Heron banded at Waseca, Minnesota, was killed near Gatun Lake, in the Canal Zone. A Snowy Egret banded on the Bear River Marshes of Utah was taken more than six years later in central-western Mexico. A White Pelican banded in the Yellowstone National Park was killed in the State of Vera Cruz, Mexico.

The Biological Survey has banded migrating wild fowl on a considerable scale in the famous Bear River Marshes of Utah, during September and October from 1914 to 1916. Nearly 1,000 Ducks belonging to nine species were thus marked. Of these 174, or about 17 per cent of the number banded, were recovered at points as far east as Kansas, south into Mexico, west to California, and north into Canada.

Such dispersal proves that these marshes serve as congregating places for migratory wild fowl journeying down from far-northern breeding grounds, and that on the approach of winter they move on to warmer regions, including California. Ap-

Photograph by Herbert

DINING ABUNDANTLY AND OFTEN ARE THE CHIEF CONCERNS OF A GULL

The birds are attracted here because of the excellent feeding afforded them by the fishermen, who habitually throw back into the sea the inedible portion of their catches.

parently, they reverse the movements in the spring.

SOME BIRDS MIGRATE AT A TANGENT

The startling fact developed by the flight of the banded Ducks from the Bear River Marshes was that many of them go westerly over the deserts of Nevada and across the Sierra Nevada to winter in California; others move east or southeast across the Rocky Mountains.

The recovery of banded birds in California in the winter, following their banding on the Bear River Marshes, proved that a considerable percentage of the Green-winged Teal, Shovelers, and Pintails gathering in the Utah marshes in autumn cross to California to spend the winter. Such cross-country flights to the east and west were previously unsuspected, and prove that the migrations of many waterfowl do not always follow the more or less definite northerly and southerly routes.

The autumn flight of banded birds breeding in these marshes appears to be similar to that of the visiting migrants.

More than 19,000 Ducks have been banded at various points in the Mississippi Valley, at Lake Scugog, Ontario, and elsewhere. Of these some 4,000 have been taken subsequently at many widely scattered localities. It is worthy of note that the returns of banded Ducks vary from about 15 to nearly 20 per cent of the number banded at the different localities.

A Pintail banded at Ellinwood, Kansas, in March, 1925, was shot in Butte County, California, in December of the same year. A Blue-winged Teal banded at Lake Scugog, Ontario, in September, was shot at Port of Spain, Trinidad Island, off the coast of South America, 67 days later.

These returns, combined with those from the Ducks banded on the Bear River Marshes, indicate that each of the important areas to which wild fowl resort in large numbers in the United States is vitally important to the maintenance of our local supply of these birds, as these central areas serve as distributing reservoirs for the surrounding States.

That a single migratory game bird may, as its fancy dictates, sojourn parts of each year in widely separated States makes it evident that State laws alone for the conservation of such species are fruitless and that the Nation must act in the matter. This emphasizes the wisdom of the Migratory Bird Treaty and the Federal laws for the protection of migratory birds.

BREEDING PLACES OF MIGRATORY WILD FOWL SHOULD BE SAFEGUARDED

Migrating, however, is only one of the doings of birds. They frequently need a meal; like other creatures, they occasionally wish to rest, and unless there is to be race suicide, they must find nesting places. These facts make it clear that the important water areas to which they resort in large numbers must be conserved and perpetuated. Efforts to protect the birds are of little avail if we do not at the same time save sufficient water areas for their present and future welfare.

Migratory wild fowl are known to breed all across the northern part of the continent and on adjacent islands from Bering Sea to Baffin Bay. Since any adverse conditions affecting them on their breeding ground will decrease the numbers that visit us in winter, they must be properly safeguarded there, as well as on their wintering grounds, in order that we may be successful in perpetuating our wild fowl. The banding of wild fowl on their nesting grounds is the only method by which the breeding places of those wintering in the different parts of the United States and Mexico can be determined.

It is a practical certainty that about two-thirds of the wild Ducks and Geese of North America winter in the southern half of the United States and on the Pacific coast. The maintenance of our supply of these birds is dependent upon the practical and effective nature of the measures taken for their conservation.

BANDING EXPEDITIONS SENT TO BREEDING GROUNDS

Several years ago the Biological Survey developed a program of sending expeditions to important breeding grounds of wild fowl all across the northern part of the continent. It planned to provide, through banding, the knowledge needed as to the origin of the supply of our migratory wild fowl and their dispersal from these points. This information will not only be of the greatest interest to sports-

Photograph from the Milwaukee Public Museum

SANDPIPERS PLAY TAG WITH THE WAVES ON THE WIND-SWEPT SHORES OF LAKE MICHIGAN

These extremely gentle little birds can be seen in the spring and fall running out in the wake of a wave to salvage some titbit from the wet sands, and retreating hurriedly as a new incoming breaker threatens to submerge them. They are not very fearful of man and offer a pitifully easy prey to the gunner, who hunts them despite their very small size. Along the far side of this inlet may be seen a series of wire-netting traps used to secure Sandpipers for banding.

men and conservationists, but will form the basis for far more intelligent work for conserving these birds than now is possible.

The first expedition was a coöperative one organized by the Biological Survey in 1924 to visit the tundra about the head of Hooper Bay, Alaska, immediately south of the delta of the Yukon River. The expedition was led by O. J. Murie, a field naturalist of the Biological Survey. The party included two other naturalists, H. W. Brandt, of Cleveland, and H. B. Conover, of the Field Museum of Natural History, Chicago, and was joined in the field by Frank Dufresne, of the Biological Survey. They reached Fairbanks on March 18 and soon after, with three sleds and dog teams, traveled to their destination across 700 miles of snow-covered country. This trip required hard work, but was accomplished without other mishaps than a temporary attack of snow-blindness suffered by two of the members.

ARCTIC BANDINGS YIELD SIGNIFICANT RETURNS

The party assembled May 1 at Hooper Bay, on the broad, treeless tundra bordering the coast of Bering Sea, to await arrival of the wild fowl. At first a belt of shore ice lay along the coast, but as it broke up the northward migration of vast numbers of wild fowl passing near the mouth of the bay was the expedition's most thrilling experience. This district had never been visited before by naturalists during the breeding season, although it was first explored and mapped by the writer during the winter of 1879 (see page 127).

As anticipated, it proved to be a marvelous gathering place for breeding wild fowl in great variety. Cackling and Emperor Geese abounded, but the White-fronted species was found sparingly. Whistling Swans, several species of Eider and other Ducks, with many kinds of waders, including Golden Plover, Pacific Godwits, Long-billed Dowitchers, and too many others to mention, kept the party at high tension amid the amazing number and variety of songs and maneuvers which endow these northern breeding places with the most intense interest through the mating season.

The banding of the Ducks and Geese by this party was the first attempt of the kind on one of the great northern breeding grounds, and the percentage of these birds taken on their southward journey during the following autumn and winter exceeded all expectations. Of three species of Geese, 213 were caught and banded, in addition to nearly 50 Ducks, and various other birds.

Of these, 153 were Cackling Geese. This is a very small geographic race of the well-known "Honker" (Canada, or Wild Goose), whose clanging notes, as their V-shaped flocks pass high overhead in the migrations, are so familiar to many in the eastern United States. Thirty-nine were killed within a few months and the bands sent to the Biological Survey.

Their capture clearly indicates their line of flight and wintering grounds. The first was reported from the Ugashik River, emptying into Bristol Bay, Alaska. The next came from more than 1,200 miles away across the open sea on one of the Queen Charlotte Islands, British Columbia. Another was taken on the Copalis Beach in Washington, others in Oregon, and then a considerable number in California, where most of these birds appear to winter in the marshes of the Sacramento and San Joaquin Valleys. A White-fronted Goose banded on July 15 was taken January 1 at Sutter, California. Banded Pintails were also taken in central California.

Such gratifying returns from this first bird-banding expedition in the north gave strong encouragement to further efforts of the kind.

EXPEDITION SENT TO YUKON BOUNDARY

Many years ago, when Thomas Riggs, later Governor of Alaska, was in charge of the International Boundary Survey between Canada and Alaska, he found many Geese breeding in the flat valley of the Old Crow River, near where it crosses the boundary, about halfway between the Arctic Circle and the Arctic coast. This area, never visited by a naturalist, afforded another opportunity for work in practically new country, where bird banding on a considerable scale might be done.

In the spring of 1926, the Biological Survey detailed Mr. Murie to visit the

Photograph by Herbert K. Job

ROYAL TERNS ARE GREGARIOUS BIRDS

Breeding in great colonies off the South Atlantic coast and the shores of the Gulf of Mexico, these birds nest so close together that it is difficult to walk through their breeding grounds without treading on the eggs.

breeding grounds there and to band as many wild fowl as practicable. At the same time he was to secure specimens of the wild life of this unknown area.

He proceeded early in the spring from Washington to Fairbanks, Alaska. Immediately after the ice broke up on the rivers he went to Fort Yukon and engaged an assistant with a motor boat. Taking in tow a small barge loaded with gasoline and other necessary supplies, they set forth on the long trip into an uninhabited and little-known wilderness.

The expedition was successful. In addition to gaining a great store of information concerning the wild life of the region, Mr. Murie placed bands on a number of Geese and other birds. During the succeeding autumn, three of the Geese were taken in western Alberta, Idaho, and Nevada, indicating a strong probability that the wild fowl on the eastern border of Alaska also winter west of the 100th meridian.

Records from the banding of Ducks on their breeding grounds and at their other great gathering places are yielding a harvest of valuable information.

MIGRATORY WILD FOWL OF THE UNITED STATES FORM TWO DISTINCT GROUPS

The returns demonstrate that migratory wild fowl in the United States, both those breeding here and those which visit us during the migration and winter, are separated into two well-marked groups: those of the region extending from the western Dakotas, western Kansas, and western Texas to the Pacific, and those which occur from the eastern Dakotas, eastern Kansas, and eastern Texas to the Atlantic.

The two areas occupied by these separate groups correspond to the arid western region and to the more humid eastern part of the continent. The 100th meridian of longitude, a commonly accepted dividing line between the arid West and the more humid East, appears to be well located for marking the boundary between these areas.

The accompanying map (see page 116)

Photograph from U. S. Biological Survey

YOUNG CASPIAN TERNS CORRALED FOR BANDING

This "haul" netted more than 700 birds. Returns from birds banded at this station in northern Lake Michigan have been received from as far south as Colombia and as far north as Nova Scotia.

shows in a diagrammatic way a few of the points where thousands of Ducks of various species have been banded and some of the points at which they have been subsequently taken. This evidence and additional facts of the same character obtained in this way strongly indicate that the birds of either the western or the eastern area might be practically exterminated without seriously interfering with the supply of birds in the other regions. This discovery is of the utmost importance in the development of the necessary conservation measures for perpetuating our wild fowl.

The number of returns of bands on birds found dead indicates the perilous existence of these habitants of field and forest. To the casual observer the birds' active movements, their songs and cheerful call notes, give the impression of a joyous life; yet birds live in the midst of deadly perils coming from many sources, and the mortality among them is enormous. In spite of many widespread disasters, however, the survivors appear to repopulate the stricken areas within a few seasons with their normal quota of bird life.

STORMS DESTROY MANY BIRDS

Unseasonably cold storms during migrations probably destroy more individuals than any other single cause. Opportunity is occasionally presented for observing their effects on bird life. Dr. T. S. Roberts made a careful survey following a spring snowstorm in Minnesota and North Dakota, and found that vast numbers of Lapland Longspurs had perished there on their northern migration. Severe blizzards in the Middle East sometimes catch a host of Bluebirds and other small species on their way north.

Following such storms, holes in trees and nesting boxes are sometimes found full of the dead bodies of the little victims that have tried to get shelter and have perished from the cold.

Telegraph and telephone wires and other obstacles kill great numbers of birds, which fly into them not only at night but

Photograph from U. S. Biological Survey

THE SNOWY OWL AT HOME

In grace and speed of flight this bird is more like a Hawk than an Owl. So swiftly does it navigate the air that it can capture a Duck on the wing or a hare afoot.

Photograph by Paul W. Hoffman

BLACK TERNS NEST IN THIS MID-WESTERN, FRESH-WATER MARSH

This is one of the comparatively few long-winged swimmers in the United States that commonly nest far away from the sea. It prefers the reedy fresh-water sloughs and marshes of the Middle Western States. Note the adult Tern perching on the operator's head. It did this repeatedly during one visit to this breeding place, apparently considering the operator a part of the scenery.

ESKIMOS DRIVING WILD GEESE TO A BANDING CORRAL

The white-cheeked Cackling Geese are the smallest of North American Geese. The individuals showing white heads are the little-known Emperor Geese.

Photographs from U. S. Biological Survey

EIDER DUCKS SUPPLY WARM CLOTHING FOR THE ESKIMOS THAT LIVE HERE

The inhabitants of this semisubterranean village near Hooper Bay are among the most primitive of the native Alaskans. During spring and summer migratory wild fowl are one of their main sources of food supply, and the skins of Eider Ducks furnish material for much of their clothing. A bird-banding expedition from the Biological Survey made its headquarters in this vicinity in 1924 (see text, page 123).

Photograph by Sumner W. Matteson

MIGRANT WILD GEESE FLY IN SILHOUETTE ACROSS A NORTH DAKOTA SUNSET

© The Detroit News

WHISTLING SWANS ARE AGAIN BECOMING A FAMILIAR SIGHT IN PARTS OF THE COUNTRY WHERE THEY WERE ONCE NEARLY EXTINCT

These majestic birds have a wing-spread of from six to seven feet and can fly as fast as many an express train travels. The notes of large flocks of Swans gathered on the small lakes of their northern breeding grounds make a wonderfully impressive, deep-toned chorus.

Photograph by Guy Amsler, © Arkansas Game and Fish Commission

AN AËRIAL TRAFFIC OFFICER MIGHT FIND WORK HERE

Great flocks of Mallard Ducks that literally darken the sky still fly over parts of the United States at certain seasons of the year. From an economic point of view the Mallard is most important to the human race, both because of its vast numbers and its wide distribution.

often in broad daylight. Formerly, when lighthouses cast steady beams of dazzling light athwart the sky, migrating birds dashed against the glass of the lights and perished in large numbers. This source of mortality seems largely to have disappeared in recent years, since the continuous light has been replaced in many instances by a series of temporary flashes.

To these dangers may be added the recurring periods of scanty food supply and the never-ending depredations of their bird and mammal foes, including man in the case of game species. Pollution of waters by various means and other man-made death traps also take their toll. With the multiplication of swiftly moving automobiles, enormous numbers of small birds haunting the highways in some districts are stricken down and their pitiful bodies lie flattened in the dust.

CIVILIZATION AFFECTS THE BIRD POPULATION

It is comforting to know, however, that civilized man is appreciating bird life as never before and is throwing about the harmless or useful species the protection of the law. Furthermore, in the United States, Canada, and some other countries refuges, which already cover many millions of acres of forest and other lands, are being established in increasing numbers. In winter food and shelter are being provided, especially in times of stress, on a growing scale.

As a consequence of the changed conditions of the country through the clearing of primeval forests and the modern protection afforded birds in the United States, it is safe to say that there are now more small birds in North America than at any previous time in our history. On the other hand, our migratory wild fowl will never again equal the vast swarms that existed in the early days before enormous areas of water and marshlands were drained.

With so many opportunities to have little aluminum records carried by winged messengers to distant places, bird banding should invite the attention of all expeditions to the Far North and of research stations in regions where wild fowl, especially Ducks, Geese, and waders, breed in large numbers.

Capturing and banding of such of the breeding waterfowl and their young as winter in southern latitudes should also offer an interesting variation to the frequently monotonous everyday routine. Some of the banded birds would undoubtedly be taken later in lower latitudes, thus bringing word to the public of those in remote northern climes and adding valuable facts to our knowledge of the travels of feathered wanderers.

The Biological Survey will take pleasure in coöperating with sportsmen or future northern travelers who may be interested in this work. It will see that they are provided with necessary instructions, numbered aluminum bands, and other small equipment. If bird banding had been developed years ago, we might now have many precious records brought by birds from places in the Arctic regions visited by Greely, Peary, and other explorers.

Notice of change of address of your NATIONAL GEOGRAPHIC MAGAZINE *should be received in the office of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your March number, the Society should be notified of your new address not later than February first.*

PRESIDENT COOLIDGE BESTOWS LINDBERGH AWARD

The National Geographic Society's Hubbard Medal Is Presented to Aviator Before the Most Notable Gathering in the History of Washington

FROM the hands of President Coolidge, Col. Charles A. Lindbergh, first to fly the Atlantic alone, received America's highest award to explorers, the Hubbard Gold Medal of the National Geographic Society, in Washington's largest auditorium, before the most distinguished audience ever gathered for such an occasion in the National Capital, on the evening of November 14, 1927.

The eminent jurists of the United States Supreme Court, virtually all the members of the President's Cabinet, and all the United States Senators and Representatives then in Washington; members of the Diplomatic Corps from all over the world in their full-dress regalia; ranking officers of the Army and Navy; the Director of the Budget; members of the Interstate Commerce Commission, and many other Government officials and noted scientists and private citizens formed the brilliant gathering which did honor to the 25-year-old hero, youngest man to receive the Hubbard Medal or any comparable honor.

FAMOUS TRANSOCEANIC FLYERS PRESENT

With the modest young flyer on the platform, besides the President of the United States, were Mrs. Coolidge, Mrs. Lindbergh, Dr. Gilbert Grosvenor, President of the National Geographic Society, and Dr. John Oliver La Gorce, Vice President of the National Geographic Society. With them were the Hon. William P. MacCracken, Assistant Secretary of Commerce for Aëronautics, and the Hon. Everett Sanders, Secretary to the President.

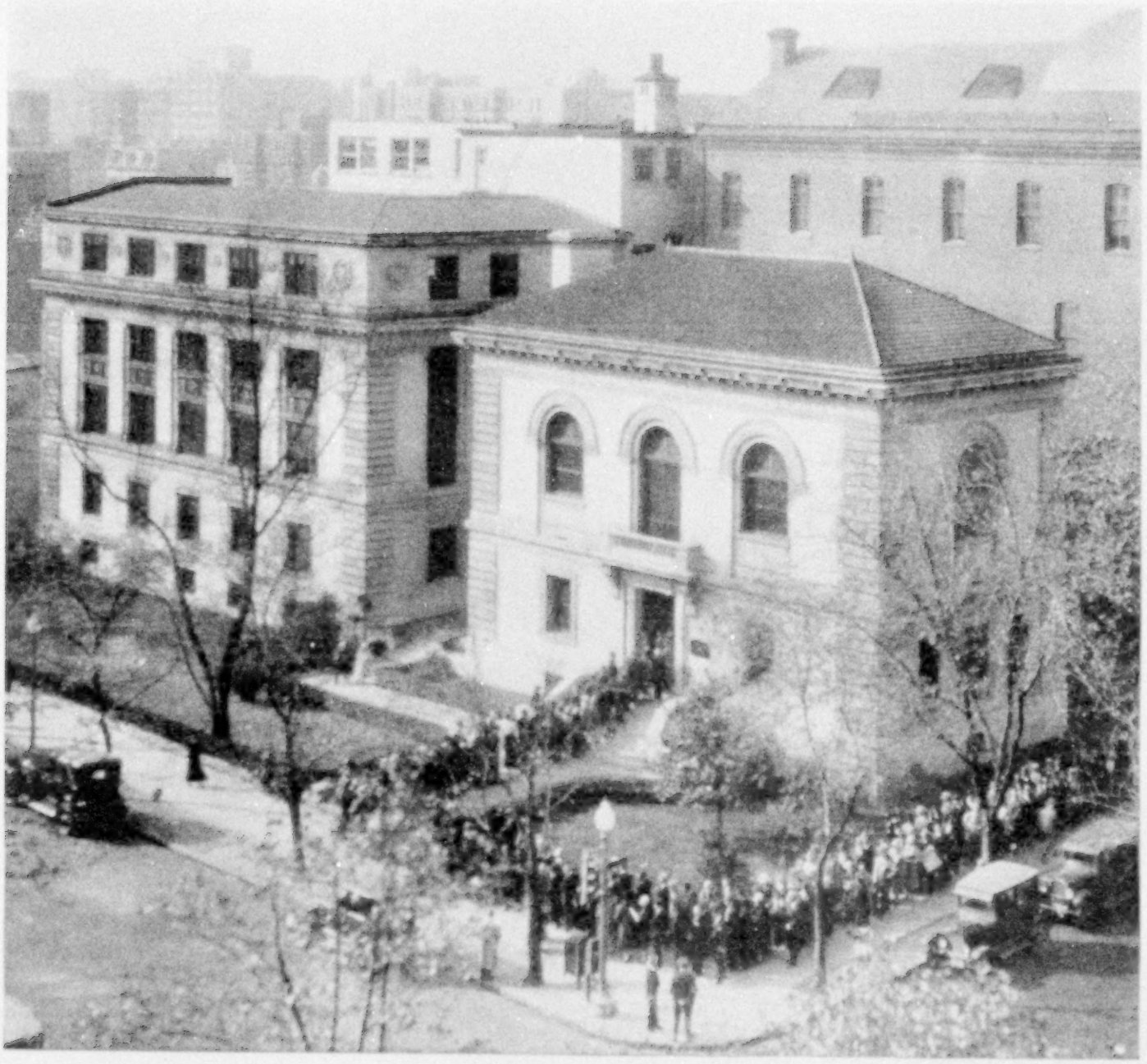
Flanking this group were famous transoceanic flyers who had contributed epochal achievements to the aërial conquests of the oceans. And with the aviators sat Dr. Orville Wright, whom many of those present remembered meeting when that pioneer of the air was in Washington with his brother conducting the experiments which culminated in launching an airplane from a creaky rail at Fort Myer, Virginia, and thus inaugurating the science which thrilled the world when Colonel Lindbergh flew from New York to Paris.

Every seat in the Washington Auditorium was taken, police guards had to be thrown around the building to keep those from entering who did not have tickets, and six thousand members of The Society saw the historic ceremonies which were broadcast to millions of other Americans. For weeks the offices of the National Geographic Society were besieged for admission to the exercises, and a clerical force had been kept busy explaining to personal applicants, and answering thousands of letters from others, that the ticket supply had been exhausted when the 6,000th fortunate member of The Society had claimed the last available seat coupon.

The U. S. Army Band began playing at 8 o'clock and at 8:35 Colonel Lindbergh entered, accompanied by his mother and Dr. La Gorce. Ten minutes later, the President of the United States and Mrs. Coolidge came on the stage with Dr. Grosvenor. Dr. Grosvenor, in presenting the President, congratulated him, as Commander-in-Chief of all our air forces, on the amazing contributions of the Government's airmen.

PRESIDENT COOLIDGE INTRODUCES COLONEL LINDBERGH

President Coolidge complimented Colonel Lindbergh's achievement in an address which was continually interrupted by applause, especially when he said that Colonel Lindbergh, after his flight, "determined to capitalize his fame, not for selfish aggrandizement, but for the promotion of the art he loves," and again when he referred to him as "this courageous, clear-headed, sure-handed youth, whose



Photograph by Benjamin A. Stewart

MEMBERS OF THE NATIONAL GEOGRAPHIC SOCIETY ARRIVING TO RECEIVE TICKETS FOR THE LINDBERGH RECEPTION

Long before the announced hour for the distribution of tickets, members of The Society began to gather before the doors of the headquarters on Sixteenth Street. Requests for more than 30,000 tickets were received. Disappointment of many was regrettable, but inevitable.

character had withstood the glare of publicity and the acid test of hero-worshiping adulation."

The President concluded by handing to Colonel Lindbergh the medal which has been bestowed on only seven other men in the 40 years of the National Geographic Society's existence and saying, "To-night I have the utmost gratification in awarding you this further recognition of achievement, the Hubbard Medal of the National Geographic Society."

Then occurred an incident which is virtually without precedent, when the President, in addition to presenting the Hubbard Medal on behalf of the National Geographic Society, paid the young explorer the gracious personal tribute of introducing him to the audience.

The applause which greeted the two figures on the platform, America's foremost hero and America's foremost citizen, persisted for several minutes before Colonel Lindbergh was able to make his acknowledgment. Meanwhile a battery of motion-picture cameras and news photographers added a picturesque touch by snapping photographs at high speed with a clicking that sounded like a miniature Battle of the Marne. The stage was illu-

minated by great flares, so that the historic scene might be recorded.

When Colonel Lindbergh was able to make himself heard he accepted the honor in a brief, graceful speech, and mingled laughter and applause greeted him when, after uttering only a few sentences, he said: "In closing. . . ."

Following Colonel Lindbergh's address, Assistant Secretary MacCracken summarized America's achievements in the air.

DR. GROSVENOR PRESENTS THE PRESIDENT

Dr. Grosvenor, in presenting President Coolidge, said:

"Mr. President, Mrs. Coolidge, members of the National Geographic Society:

"During the last four years American navigators of the air, with bewildering rapidity, have made voyage after voyage of amazing importance.

"The first round-the-world flight, the first North Polar flight, the first circumnavigation by air of Central and South America, the first flights to Hawaii, the first flight from New York to Tokyo via Europe, the first, second, and third transatlantic flights from New York to Europe in one summer! And world records for altitude attained in a plane and for millions of miles flown with air mail without accident!

"To the greatest of these achievements the National Geographic Society has now assembled to pay tribute.

"In order that the acknowledgment to our dauntless young navigator may be truly national, our warm-hearted Chief Magistrate has generously honored us by his presence.

"In every one of these outstanding voyages, so fruitful in scientific knowledge, the aviators were men trained, developed, inspired in the Government Service.

"And so to you, Mr. President, the Commander-in-Chief of all of our air forces, whose clear, practical, constructive program has guided, encouraged, and stimulated an air conquest that is phenomenal, the members of the National Geographic Society throughout the Nation extend most earnest and respectful congratulations.

"Ladies and gentlemen, the President of the United States."

PRESIDENT COOLIDGE LAUDS THE AIR HERO

President Coolidge spoke as follows:

"Fellow Countrymen:

"Transportation and communication are essential to civilization. Within the year an encouragement has been given to their development that has few parallels in history. The principles of aviation were demonstrated first by Americans at the turn of the last century. In the intervening years their science progressed, both here and abroad. Important flights were made.

"It remained for one of our own citizens in May, 1927, to arouse universal interest in the practical possibilities of travel through the air. His flight, alone and unaided, from New York to Paris thrilled the world. It appealed to the imagination of humanity. How the hero of this exploit was revealed, not as a reckless adventurer, but as an able, sober-minded, modest young man of high and unselfish purpose, has now passed into history. What he did to strengthen the cordial relations between our people and Europe is well known. The wonderful and sincere welcome he received abroad, the acclaim that greeted him at home, are still fresh in the public mind.

"But that was not all. With a clear conception of public service, he determined to capitalize his fame, not for selfish aggrandizement, but for the promotion of the art he loves. He was unmoved by the many opportunities for private gain. The flight to Europe was spectacular. It stirred the heart of the people. But foremost in his mind was the permanent good that might come from thus having directed public thought to human flight. This courageous, clear-headed, sure-handed youth, whose character had withstood the glare of publicity and the acid test of hero-worshiping adulation, became an apostle of aëronautics. He dedicated himself to advancing the science and practice of aviation.

"Taking little time to recover from the strain of his experiences, he started on a missionary tour of over 22,000 miles. Flying in his *Spirit of St. Louis*, the 'Spirit of America' visited 82 cities in our 48 States. Only once did he fail to arrive on

Photograph by Pacific and Atlantic

PRESIDENT COOLIDGE ADDRESSING THE NATIONAL GEOGRAPHIC SOCIETY ON COLONEL LINDBERGH'S ACHIEVEMENTS

Seated on the platform, front row (left to right), are: Dr. John Oliver La Gorce, the Hon. Everett Sanders, Secretary to the President; Mrs. Evangeline Lindbergh, Mrs. Coolidge, Dr. Gilbert Grosvenor, Col. Charles A. Lindbergh, and the Hon. William P. MacCracken. In the second row were Dr. Orville Wright, Mr. Harry F. Guggenheim, and the transoceanic flyers: Mr. William S. Brock, Mr. Emory Bronte, Miss Ruth Elder, Mr. Arthur C. Goebel, Mr. George Haldeman, Lieut. Albert F. Hegenberger, Lieut. Lester J. Maitland, Mr. Edward F. Schlee, Mr. Paul Schlueter, Lieut. Ernest L. Smith, Miss Thea Rasche, and Mrs. Clarence Chamberlin, representing her husband.

scheduled time, establishing a record for reliability. He spoke not about himself, but for airways and airports in 147 speeches and 192 messages dropped from the clouds. Because of what he has said and done we are told aëronautic plans for 1928 indicate an activity far beyond any dreams of six months ago.

"Col. Charles A. Lindbergh, it has been the privilege of few to do as much for a cause in so short a period of time. You have richly merited the many honors already bestowed. To-night I have the utmost gratification in awarding you this further recognition of achievement, the Hubbard Medal of the National Geographic Society."

COLONEL LINDBERGH'S REPLY

Colonel Lindbergh spoke briefly in acknowledgment of the President's address.

In accepting the medal he said:

"Mr. President and Members of the National Geographic Society:

"First, I want to thank you all for the great favor which has been bestowed on me to-night. The National Geographic Society has aided greatly in the advancement of civilization and in the discovery of many parts of the world and in the upward trend of this country.

"It has been first in the field of exploration and has aided greatly in the development of aviation. In the past, in exploration especially, it required years for achievements that may be made now in hours. In the future it is the hope of the aëronautical industry that the airplane will do its part in discovery and in bringing together and uniting more closely the nations.

"In closing, I want again to thank you. I hope and believe that in the near future we will be flying over practically every corner of the world, and that the airplane

Official Photograph, U. S. Army Air Corps

AN ESCORT OF ARMY PLANES IN FLIGHT OVER WASHINGTON

The Washington Monument, in the right foreground, was the first object seen by Colonel Lindbergh as he approached the National Capital on the flight from Richmond near the end of his tour of the forty-eight States (see pages 1-46).

will unite more closely the nations than they are to-day."

DR. GROSVENOR PRESENTS SECRETARY MAC CRACKEN

Introducing the Hon. William P. MacCracken, Assistant Secretary of Commerce for Aëronautics, Dr. Grosvenor said:

"Colonel Lindbergh's travels by air have done so much for 'the increase and diffusion of geographic knowledge'—the purposes for which the National Geographic Society was founded—that he will, we think, be interested to know that participating in the presentation of this medal are members of this Society residing in 169 countries and mandatories.

"Its membership reaches to the uttermost corners of the globe and even to its most isolated and remote islands.

"For instance, sharing in the pleasure of this award to him are 11,000 members in Australia and New Zealand, 200 in the Fiji Islands, 450 in Java and Sumatra, 10,000 in Central and South America, 28,000 in Europe, 50,000 in Canada, and more than one million members in the United States.

"Many thousands of members are listening in to-night, and to them The Society sends greetings (see text, page 139).

"I now have the honor to present the distinguished Assistant Secretary of Commerce for Aëronautics, the Honorable William P. MacCracken."

"SINNER AND SAINT PRAYED FOR HIS SUCCESS"

Mr. MacCracken said:

"We have just been privileged to witness the conferring of the highest award which the National Geographic Society bestows upon explorers.

"The President had previously expressed the Nation's regard for its recipient and his great achievement, when he welcomed Colonel Lindbergh upon his return from France.

"An unknown civilian aviator, working for an air-mail contractor, he took leave to fly from New York to Paris. For 33 hours and 29 minutes he held the attention of the entire civilized world. Irrespective of nationality, creed, or occupation, sinner and saint prayed for his success. When at the end of their vigil he was acclaimed the victor, nations were brought to a clearer realization of the brotherhood of man, and the cause of civilian aviation was advanced to an extent which gold alone could never purchase.

"Great as his achievement was and deep as it endeared him in the hearts of his fellow countrymen, the conduct of Colonel Lindbergh since landing at Le Bourget has done more to inspire admiration for him and faith in the youth of to-day than did his flight itself.

"We in aviation recognize in the President one of the great men who has served this Nation as its Chief Executive. His keen interest in all phases of aëronautics has been in a large measure responsible for the progress made during the past few years. His recognition of these transoceanic flyers and their deeds is appreciated not only by them, but by all the aëronautic fraternity.

AVIATION'S GIFT TO GEOGRAPHY

"We have foregathered here as members of one of the world's greatest societies. Its primary purpose, inspired by altruistic motives, is to collect and diffuse geographic knowledge. All forms of transportation have proven valuable adjuncts toward accomplishing these aims; but none has ever presented possibilities as great as those offered by aëronautics.

"Exploration and travel are indispensable to geographic education. Expeditions which heretofore cost months in time and much in human hardships and sacrifice can now be accomplished in a matter of hours, with less exposure of personnel, by means of aircraft. Hazards there will always be in pioneering, but these are but an item in the sum total of the price of progress. Every achievement takes its toll, and we, who are the beneficiaries of what has gone before, do well to pay tribute to our contemporaries who have made their contribution to the well-being of posterity.

"In an era teeming with invention and its resulting application to commerce and industry, it is difficult to ascribe to each its true value. The use of aircraft conserves time—the stuff that life is made of—facilitates travel, bringing together in closer relationships and better understand-

ing peoples of all nations; expedites commerce, with resulting prosperity; provides more effective means for exterminating crop- and life-destroying insects, and assists beyond measure man's battle against the destructive forces of fire and flood.

"There is not a man, woman, or child in this Nation to-day who is not more secure in, and better able to enjoy, all that life holds dear by reason of the pioneering that has been done in civil aëronautics. Comparatively few in number are they that realize this, and still fewer fully comprehend its future possibilities. Truth is not always obvious, but faith sustains when vision fails.

"May I recount briefly something of what our Nation has contributed to the development of aviation. It includes the invention and first flight in an airplane, the first transatlantic flight, the only flight around the world, and the first flight to the North Pole.

"During this year alone American pilots, using aircraft and engines designed and built in the United States, completed a series of world-renowned transoceanic flights, spanning time and again the Atlantic, and the Pacific from the mainland to the Hawaiian Islands. These expeditions are frequently referred to as 'American stunt aviators,' but their real significance is far greater than that designation implies. They have done much to promote international good will, as well as to stimulate interest in aviation. All the participants in these great undertakings are worthy of our unstinted praise.

NIGHT FLYING PROVED PRACTICABLE BY POST OFFICE DEPARTMENT

"Our Post Office Department first demonstrated to the world the practicability of night operations of aircraft for commercial purposes when it established regular night service between Chicago, Illinois, and Cheyenne, Wyoming—a distance of about 900 miles. This original service, which has not as yet been equaled elsewhere in the world, in a little over three years' time has increased nearly fivefold. The operation, wholly in the hands of private enterprise, is now self-supporting, while every European air line is heavily subsidized.

"Our supremacy in air-mail volume, mileage, and profitable enterprise is generally conceded. While our passenger and express traffic on scheduled lines is not comparable to our air-mail record, it is greatly underestimated. Air-mail contractors are now directing their attention to this branch of service, with every indication of equal success.

"Activities in all other branches of civilian aviation in the United States exceed the combined similar activities of the entire world. This includes the number of planes produced and in operation, miles flown, goods and passengers carried on other than regular schedules, photographs taken, areas patrolled, acreage dusted, and money earned. With these achievements, no longer should an inferiority complex impede our aëronautical progress.

"The Army and Navy have participated in and contributed much to the pioneering success of civilian aviation. It is but logical that there should always be the closest coöperation between civil and military aëronautics, for they are indispensable to each other. We may all take pride in these accomplishments and should render our whole-hearted support individually and collectively toward making and keeping America first in the air.

HOW THE PUBLIC CAN AID CIVIL AVIATION

"The prosperity and political success of our Nation is in no small measure due to its highly developed systems of transportation and communication. That form of transportation which exceeds all others in speed and flexibility is bound to play an important part in this Nation's future. Whatever else may be said about aircraft, certainly it provides the swiftest and most elastic means of transportation that ever has been or probably ever will be developed.

"We are still in the initial stage of its application to the needs of industry and commerce, as well as its service to the general well-being of mankind. Each and all of us may coöperate in one or more capacities, by using the air mail and express, traveling by air, fostering community airport development, keeping informed about aëronautics, and applying our ability toward solving technical and economic problems.

"Those who participate in making aërial operations more general, economic, and reliable will find themselves engaged in a task of national importance and absorbing interest. Let it never truthfully be said of any of us that we failed to give our utmost support to civil aëronautics — truly a harbinger of geographic knowledge, good will, prosperity, and national security."

International Newsreel

PRESIDENT COOLIDGE PRESENTS THE HUBBARD MEDAL TO COLONEL LINDBERGH

The presentation of the National Geographic Society's highest award was made in the presence of 6,000 members assembled in the Washington Auditorium. The medal bears the following inscription: "Awarded by the National Geographic Society to Charles A. Lindbergh for his heroic service to the science of aviation by his solitary flight from New York to Paris, May 20-21, 1927." (See "Air Conquest," in the NATIONAL GEOGRAPHIC MAGAZINE for August, 1927.)

MILLIONS HEAR CEREMONIES OVER THE RADIO

In addition to the 6,000 persons in the Auditorium, millions of Americans heard the foregoing addresses and were thrilled by the applause over the radio, the National Broadcasting Company having arranged to broadcast the proceedings over a chain of fifteen stations, including WRC, Washington; WBZA, Boston; WBAL, Baltimore; KSD, St. Louis; WMC, Memphis; WJZ, New York; WHAM, Rochester; KDKA, Pittsburgh; WHAS, Louisville; WSB, Atlanta; WBA, Springfield; WJR, Detroit; KYW, Chicago; WSM, Nashville, and WBT, Charlotte.

At the conclusion of the addresses, the speakers, flyers, and other participants in the ceremonies left the platform and took seats in the Auditorium, where for an hour they saw, in motion pictures,* a historical pageant of the outstanding achievements in aviation since those early days, nearly two decades ago, when the Wright Brothers gave their first demonstration flights for the United States Government.

Motion-picture archives throughout the world were requisitioned in order to show the early flights of Dr. Orville Wright, the first flight made by a woman (Miss Harriet Quimby, of Massachusetts) across the English Channel, Commander

*"Heroes of the Air," a film record especially assembled for the National Geographic Society through the courtesy of Paramount Famous Lasky Corporation.

Albert C. Read, U. S. N., and his *NC-4* upon the completion of the first transatlantic flight in 1919; the reception accorded the intrepid British flyers, Alcock and Brown, upon the completion of the first nonstop flight across the Atlantic; the greeting given the U. S. Army Around-the-World Flyers by President Coolidge at Bolling Field; also the President's reception of the Army's Pan American Good Will Flyers;* the reception accorded Commander Richard E. Byrd, conqueror of the North Pole by air, and his associates upon their arrival in France after one of the most dramatic transoceanic flights of history;† the take-off of the Detroit-to-Tokyo flyers; the picturesque floral reception accorded the San Francisco-to-Hawaii flyers in Honolulu; the milling throngs which in their enthusiasm almost mobbed Miss Ruth Elder and her pilot, Mr. Haldeman, upon their arrival in Paris, and, finally the thrilling story in pictures of Colonel Lindbergh's flight in the *Spirit of St. Louis* and his reception both abroad and at home.

NOTED AUDIENCE AT HISTORIC CEREMONY

Among the members of The Society and their invited guests present in the flag-decked Washington Auditorium for the presentation were: The Chief Justice of the United States and Mrs. William Howard Taft, Mr. Justice and Mrs. Edward Terry Sanford, Mr. Justice and Mrs. Harlan F. Stone, Mr. Justice and Mrs. Pierce Butler, and Mr. Justice James Clark McReynolds, of the U. S. Supreme Court.

The Secretary of State and Mrs. Kellogg; the Secretary of War and Mrs. Davis; the Attorney General and Mrs. Sargent; the Postmaster General and Mrs. New; the Secretary of the Navy and Mrs. Wilbur; the Secretary of the Interior, Mr. Work; the Secretary of Agriculture and Mrs. Jardine; the Secretary of Labor and Mrs. Davis.

The Speaker of the House of Representatives and Mrs. Nicholas Longworth; Senator and Mrs. Bayard; Senator and Mrs. Broussard; Senator and Mrs. Cameron; Senator and Mrs. Copeland; Senator Curtis; Senator and Mrs. Dale; Senator du Pont; Senator and Mrs. Edge; Senator and Mrs. Fletcher; Senator and Mrs. Gillett; Senator and Mrs. Glass; Senator Hale; Senator and Mrs. Howell; Senator and Mrs. Andrieus A. Jones; Senator and Mrs. Norbeck; Senator and Mrs. Overman; Senator and Mrs. Phipps; Senator and Mrs. Shortridge; Senator and Mrs. Simmons; Senator and Mrs. Ashurst; Senator and Mrs. Caraway; Senator and Mrs. Harris; Senator and Mrs. Kendrick; Senator and Mrs. David A. Reed; Senator and Mrs. Sackett; Senator Steiner; Senator and Mrs. Tyson.

Hon. John Q. Tilson, Majority Floor Leader of the House of Representatives, and Mrs. Tilson; Hon. Fred A. Britten, of the Naval Affairs Committee, and Mrs. Britten; Hon. Bertrand H. Snell, Chairman of the Rules Committee, and Mrs. Snell; Hon. Frederick N. Zihlman, Chairman of the District of Columbia Committee, and Mrs. Zihlman; Hon. Allen T. Treadway, of the Ways and Means Committee, and Mrs. Treadway; Hon. Theodore E. Burton, Representative Mary T. Norton, and others.

The Ambassador of Great Britain and Lady Isabella Howard; the Ambassador of Japan and Madame Matsudaira; the Ambassador of Peru, Dr. Hernán Velarde; the Ambassador of Spain and Señora Padilla; and the Ministers of Austria, Bulgaria, China, Colombia, Costa Rica, Denmark, the Dominican Republic, Egypt, Finland, Honduras, Ireland, Nicaragua, Panama, Persia, Poland, Rumania, Salvador, Serbs, Croats and Slovenes, Siam, Uruguay, and Venezuela.

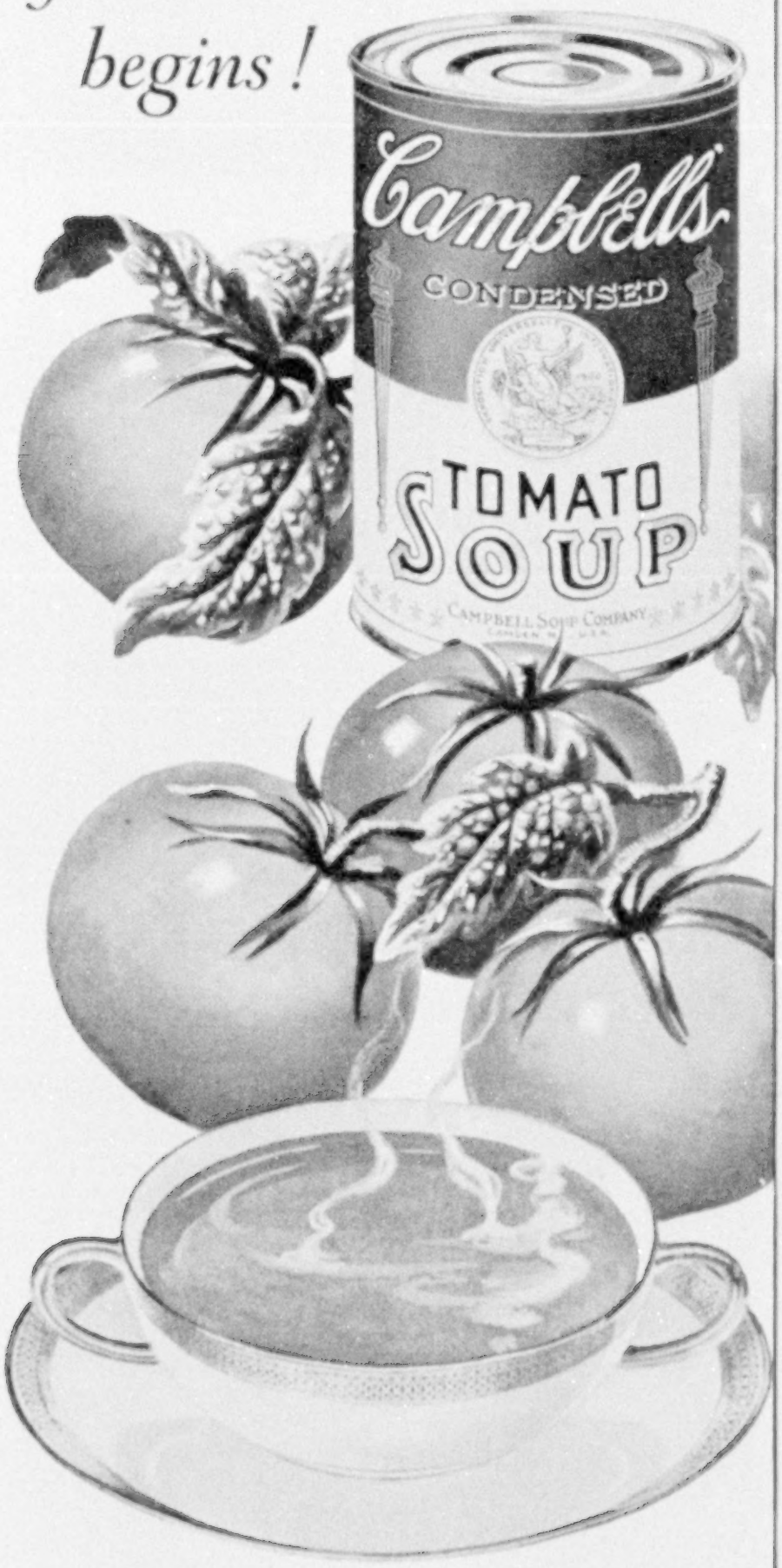
The Board of Trustees of the National Geographic Society; Hon. Theodore Douglas Robinson, Assistant Secretary of Navy; Hon. Edward P. Warner, Assistant Secretary of Navy for Aëronautics; Hon. F. Trubee Davison, Assistant Secretary of War for Aëronautics.

Representatives of the learned professions, and correspondents for the foremost periodicals and daily newspapers of America and of the foreign press.

* See "How Latin America Looks from the Air," by Maj. Herbert A. Dargue, in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1927.

† See "The First Flight to the North Pole," and "Our Transatlantic Flight," by Commander Richard E. Byrd, in the NATIONAL GEOGRAPHIC MAGAZINE for September, 1926, and September, 1927, respectively.

-and here the charm of the meal begins!



SOUP

and the woman "from Missouri"

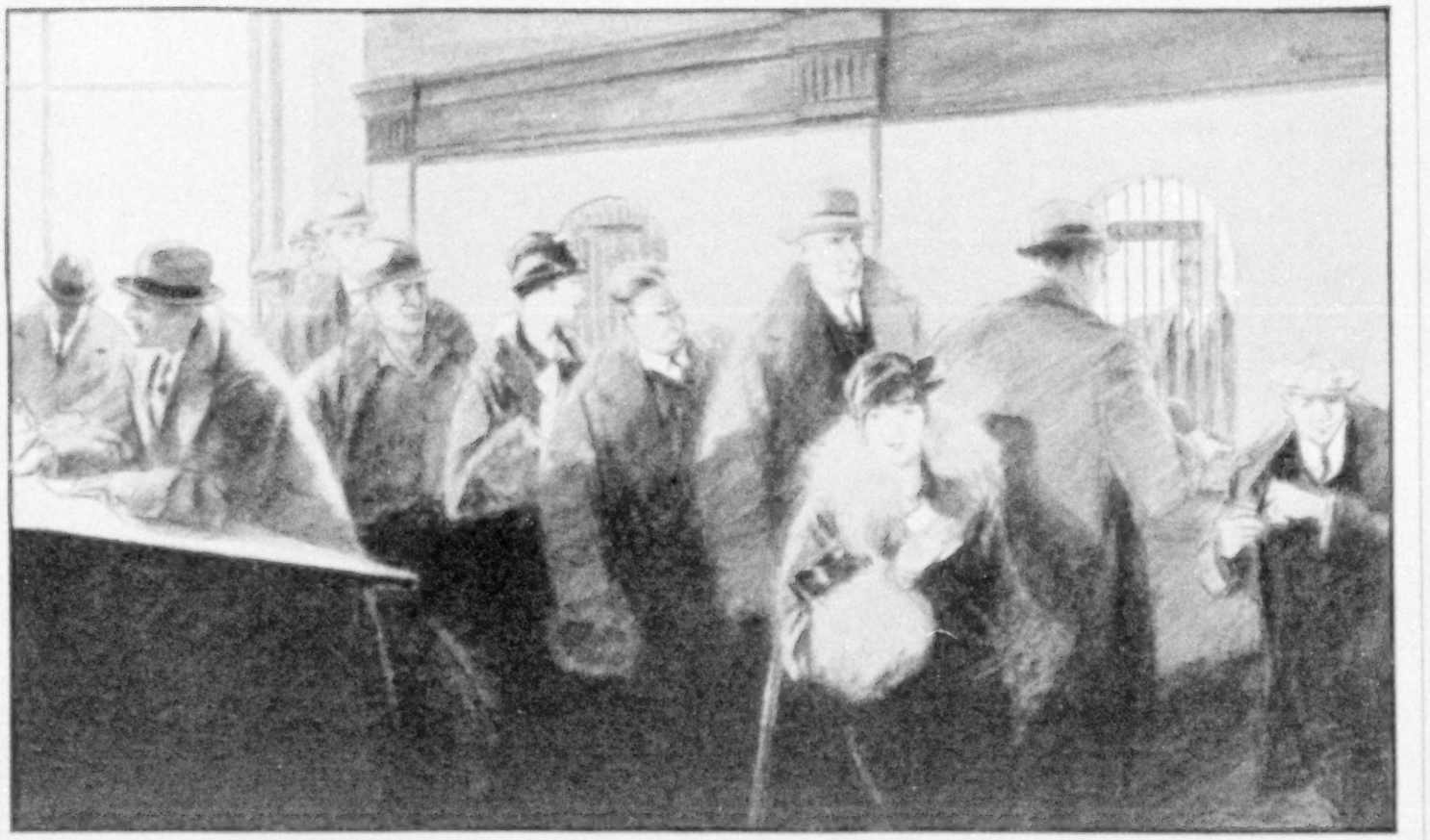
ALL praise to this worthy housewife. Nothing but the best will do for her family. One can picture her working and with relentless zeal, laboriously going through all the tedious and troublesome steps of making her soups in her own kitchen, as her mother did before her. And you can be sure her soups are good—make no mistake about that.

BUT just across the street, or in the house next door, no doubt, is a neighbor with just as particular tastes and notions about the quality of food she puts on her table. Only she has had the wit to "try" those soups that are sold at the store. To her delight, and often to her astonishment, she has discovered that the ready-made condensed soups are just as delicious, as she herself makes.

ADDING an equal quantity of water. Bringing to a boil. Simmering a few minutes. That is all. The soup is ready for your table. Twenty-one different soups—each one a masterpiece—and the full list printed on every Campbell's label. 12 cents a can.

We blend the best with careful pains
In skillful combination.
And every single can contains
Our business reputation.

WITH THE MEAL OR AS A MEAL SOUP BELONGS IN THE DAILY DIET



Who are these Investors?

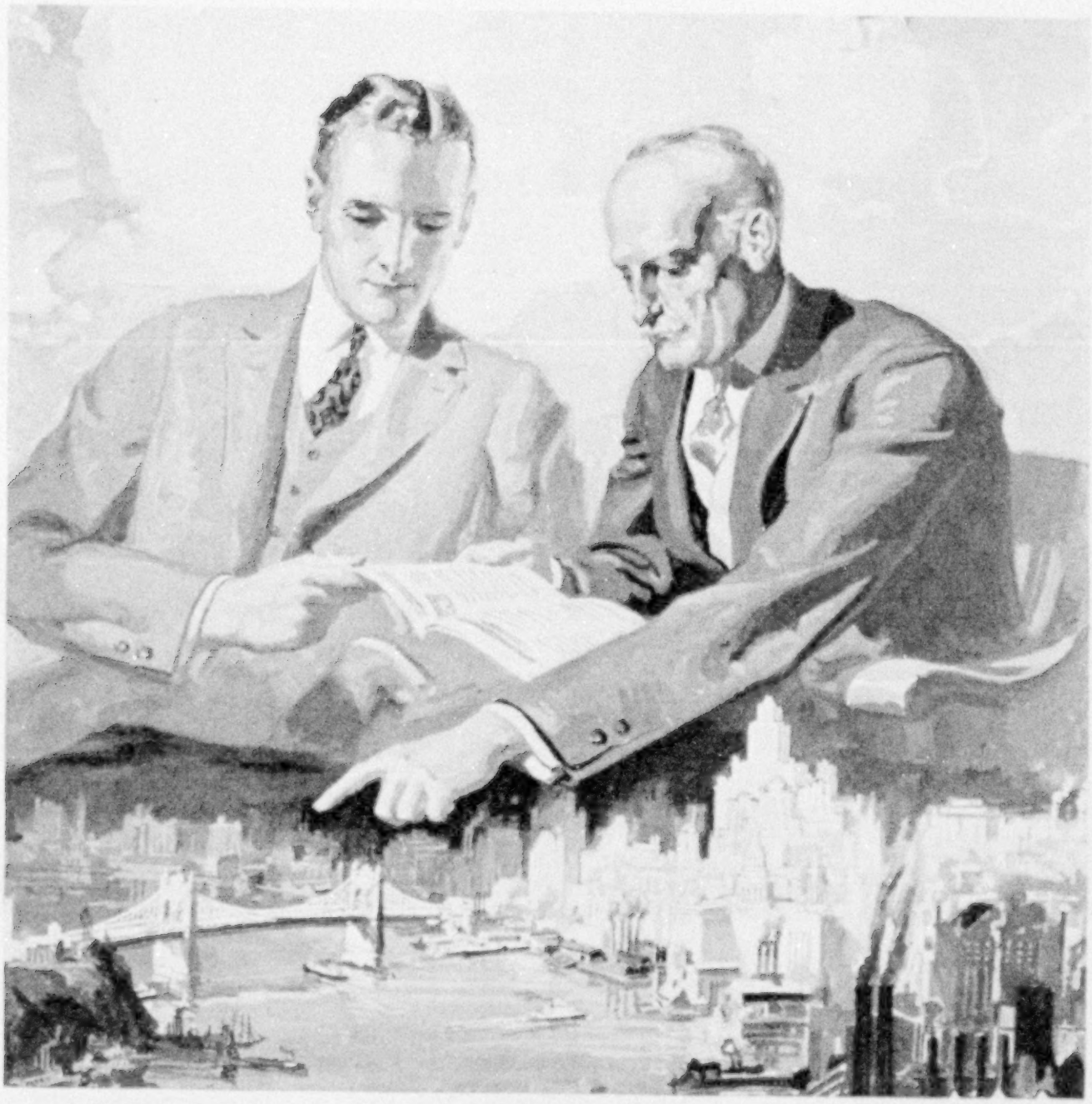
An Advertisement of the
American Telephone and Telegraph Company

TEN years ago fifteen of the largest corporations in the United States had a total of approximately 500,000 stockholders. Today the American Telephone and Telegraph Company alone has more than 420,000 stockholders.

This is an instance of the amazing growth of saving and investment that has taken place in this country. Who are these new investors?

American Telephone and Telegraph stockholders come from every rank and file in every state, nearly every town and city, in the land. Mechanics and merchants, teachers and bankers, laborers and lawyers—every station of life is represented in this investment democracy. And it is a democracy, for the average holding is only 26 shares. No one person owns as much as 1% of the total stock.

The American Telephone and Telegraph Company and its associated companies comprising the national Bell Telephone System are owned by the people they serve.



"I shouldn't decide it alone"

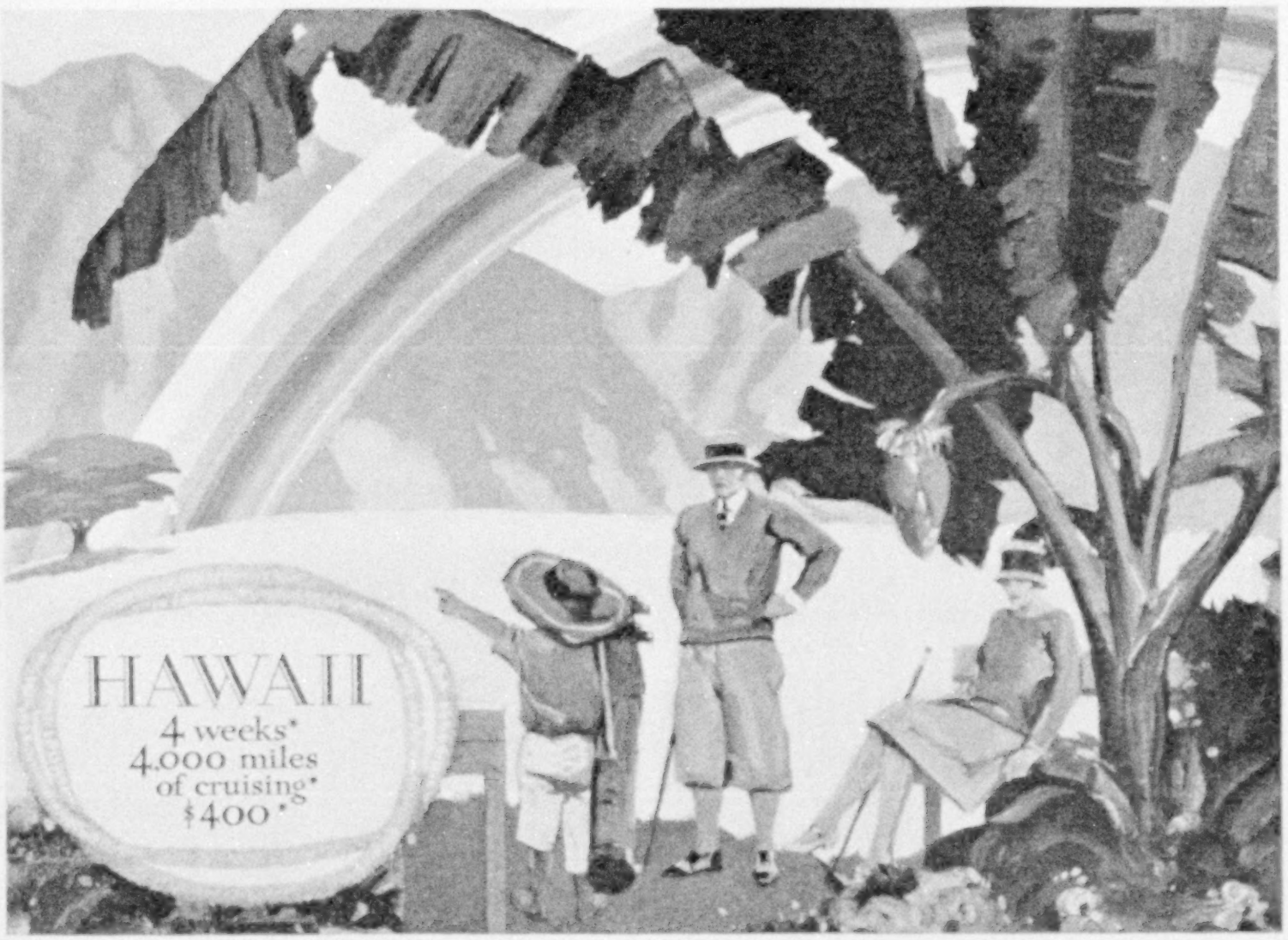
A MAN with a few thousand dollars to invest has a perplexing range of possibilities before him. Values must be appraised, past records studied and future trends estimated. But the investor should not try to decide alone. He can get the considered opinion of a world-wide investment organization—it is his for the asking. National City judgment as to which bonds are best for you is based on both strict investigation of the security and analysis of your own requirements.

The National City Company

National City Bank Building, New York

OFFICES IN 50 AMERICAN CITIES · INTERCONNECTED BY 11,000 MILES OF PRIVATE WIRES · INTERNATIONAL BRANCHES AND CONNECTIONS

Spend an unforgettable vacation in the world's new island playground



"The next green is just beyond the flame-tree," says your caddy, "—right in the middle of the rainbow!"

Pinch yourself! You're in a fairyland where rainbows shine even in the warm Hawaiian moonlight—where the rustle of coco-palms and the whisper of silken surf lulls you to an afternoon siesta.

HAWAII is like no other place on earth. Colorful cosmopolitan crowds throng the *lanais* of its world-famous hotels at tea-time—yet you may choose to join a dinner-party in the old Hawaiian style, with roast pig, *poi*, and fish that you helped to net.

BRING YOUR GOLF CLUBS! There are a dozen courses on these gem-like islands with the tang of the South Seas in their native names. Maui, Kauai, Hawaii and Oahu—you'll never decide where the scenery thrilled you most, or where you would rather build your island home. Hawaii is enjoyable all year round; you can count on a thermometer that stays below 85° in summer and above 65° in "winter."

Make This Vacation Different!

COME TO HAWAII for a rest from all the humdrum of home and business! See what the tonic ozone of cool southern trade winds will do for tired nerves. Find yourself eager for new action—for surf-boarding and outrigger-canoeing at Waikiki, for deep-sea game fishing, for swimming, for scenic motor trips, for a trudge across the frozen lava and through the giant tree-fern jungle of Kilauea Volcano.

YOUR LOCAL TOURIST AGENCY or railroad or steamer office can book you direct from home. No customs, passports or formalities for U. S. citizens in this island territory of your own. $14,000,000 worth of new hotels and steamships assure you of every travel luxury.

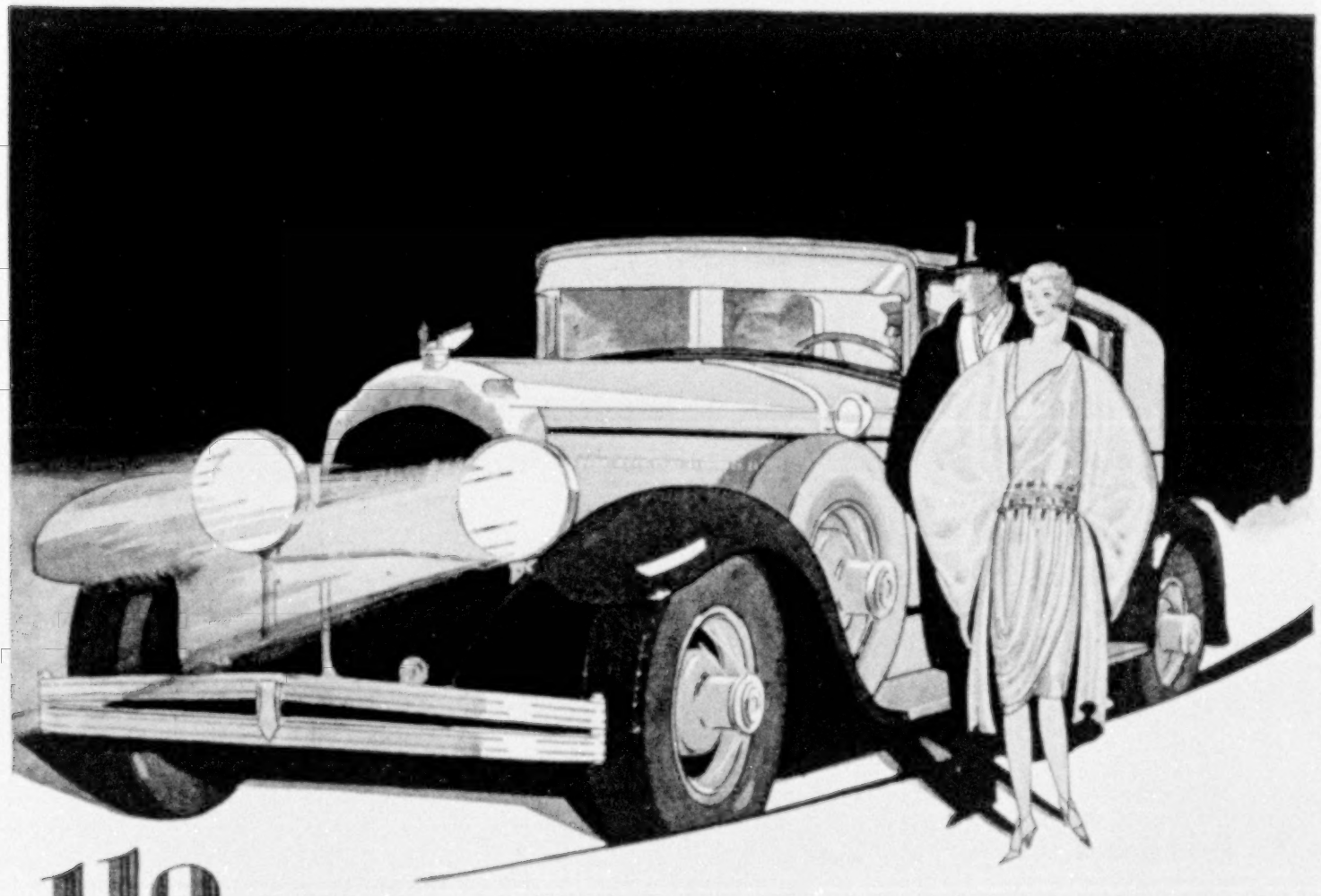
*$400 TO $500 WILL PAY for first class steamer accommodations from San Francisco, Los Angeles, Seattle or Vancouver to Hawaii and back again—2,000 miles each way—including two weeks' stay at Hawaii's finest hotels, and your inter-island trips. Don't disappoint yourself—stay longer! Hawaii offers comfortable hotels, hotel cottages, and apartments to suit any travel allowance.

FIND OUT MORE about Hawaii today—from your own ticket or tourist agent. And sent the coupon below to the *Hawaii Tourist Bureau, 311 McCann Bldg., San Francisco, or P. O. Box 375, Los Angeles, or 341 Fort St., Honolulu, U. S. A., for illustrated booklet in color.*

(USE THIS COUPON)

Please send Hawaii Booklet in colors to the address written in margin below

311



112 H.P. AMERICA'S MOST POWERFUL MOTOR CAR

With the new 112 h. p. Imperial "80" Chrysler now introduces into the field of finest motor cars a new modern note of simple excellence.

Powerful, graceful and fleet, this newest Chrysler emphasizes efficient simplicity in engine and chassis, and the charm of simple good taste in body and lines.

The new 112 h. p. "Red-Head" high-compression rubber-mounted engine—a marvel of clean design—is smooth and alert, easy to drive, maintain or control. No less powerful car can approach its flawless performance.

Graceful lines and luxurious custom bodies contribute importantly to Imperial "80" pre-eminence. In their simplicity of design and correctness of good taste there is not even a hint of that over-ornamentation sometimes mistaken for smartness.

Custom bodies are built by Locke, Le Baron, Dietrich, and by Chrysler in a special plant, acquired and equipped solely to produce these fine examples of coachwork.

Five body styles—Roadster, Town Sedan, 5-passenger Sedan, 7-passenger Sedan, Sedan Limousine—$2795 to $3495. Also in custom-built types by Chrysler, Dietrich, Locke and Le Baron, up to $6795. All prices f. o. b. Detroit, subject to current Federal excise tax. Chrysler dealers are in position to extend the convenience of time payments.

CHRYSLER

IMPERIAL "80"

The giant

Ship of Splendor

HOMERIC

one of the world's greatest, best-equipped and most luxurious steamers—*the largest ship cruising to the*

MEDITERRANEAN

Sails again for her

CRUISE SUPREME

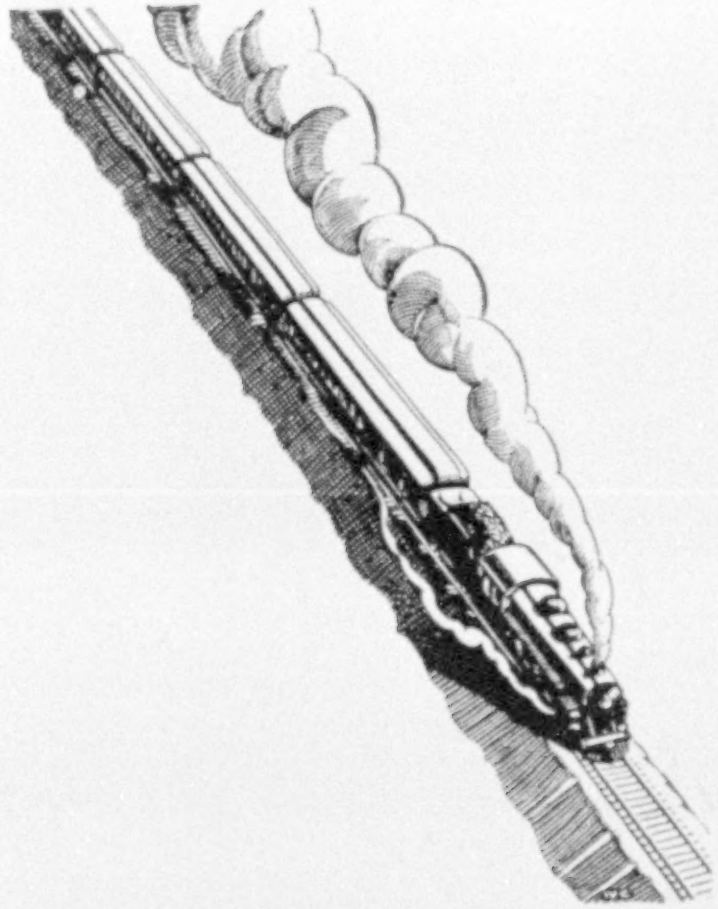
On January 21, 1928

The outstanding success of the Homeric Cruises of 1923, 1925, 1926 and 1927 and the unusually attractive list of passengers to date are a gratifying tribute of which we are justly proud. Some select accommodations are still available and early applications should be made.

The itinerary this year—comprehensive, as always—covers Madeira, Southern Spain, Gibraltar, Algiers, Tunis, Athens, Constantinople—a long stay in Egypt—the Holy Land; Italy, the French Riviera. Stop-over privileges in Europe. Illustrated Cruise Guide Book and full information upon request.

Thos. Cook & Son

New York Philadelphia Baltimore Boston
Chicago St. Louis San Francisco Los Angeles
Portland, Ore. Toronto Montreal Vancouver



AT THE END OF A TRIP, did you ever find your clothes looking as though they had been smoothed down with a rake? Owners of Oshkosh Trunks are blissfully free from experiences like this.

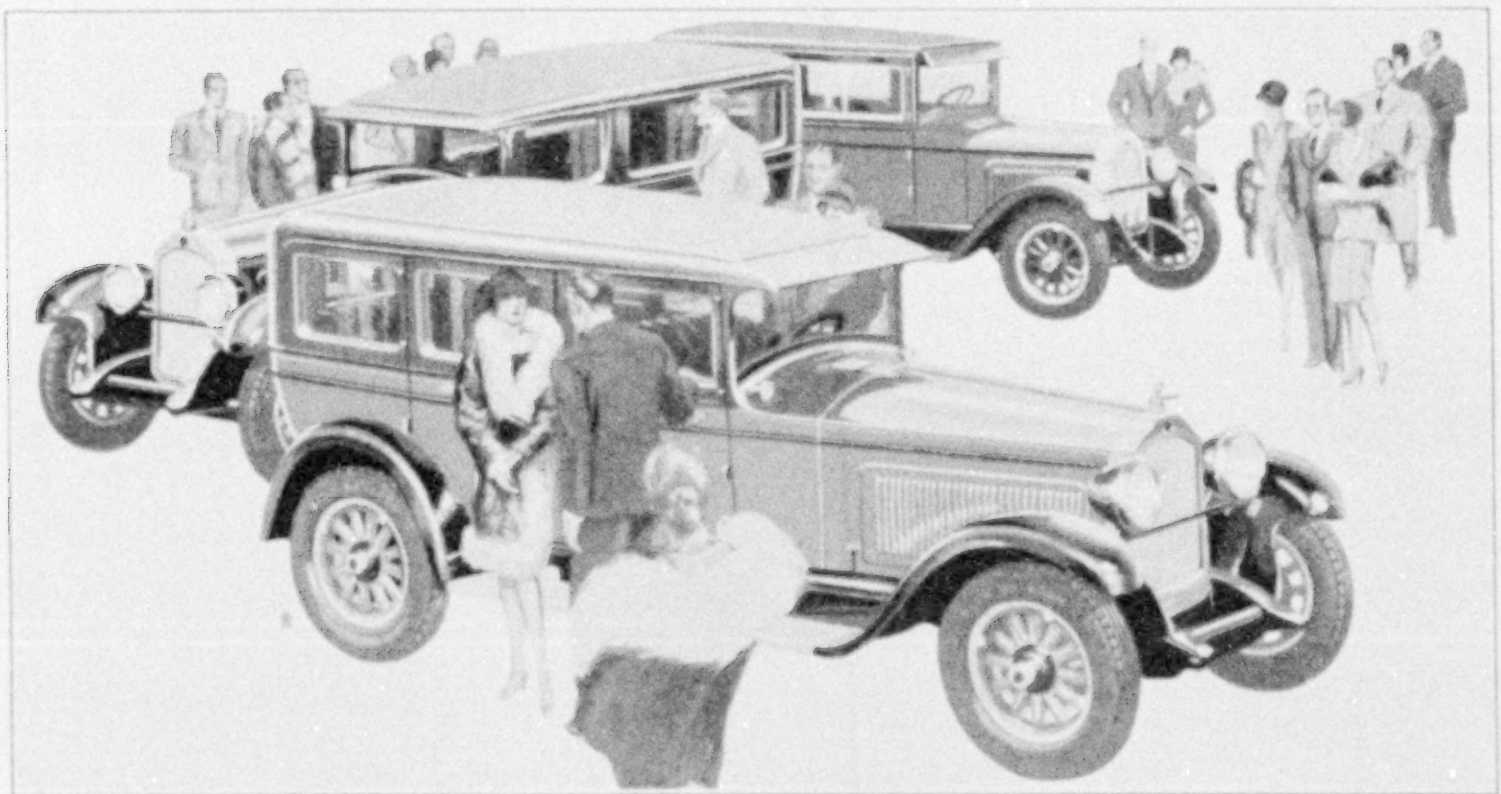
An attractive, descriptive booklet, "Your Home Away From Home," will be sent you on request to 447 High Street, Oskhosh, Wisconsin.

THE OSHKOSH TRUNK COMPANY
Oshkosh, Wisconsin, and New York City

OSHKOSH

Trunks

The Great
WILLYS-OVERLAND Line
Sets New High Standards for 1928



Engineering Leadership Again Expressed in Even Greater Values

Both Willys-Knight and Whippet cars for 1928 have been brought to a new point of perfection—carrying on the Willys ideal of offering utmost value in every price class.

The Willys-Knight PATENTED sleeve-valve engine—simple, reliable, easy to start—stands out as the supreme high compression motor. Its spherical cylinder head and sliding metal sleeves insure *highest uniform compression with any gas*. Here is the one type of power plant which actually grows smoother and quieter with use.

And, reflecting the engineering skill which developed the Willys-Knight sleeve-valve engine, the Whippet brings the advantages of high compression to the light car field. Willys-Overland knowledge of the principles of high compression has produced an amazingly efficient poppet-valve motor, capable of developing twice its rated horse-power.

This great line may be seen at all Willys-Overland dealers' display rooms. Don't fail to view these beautiful automobiles.

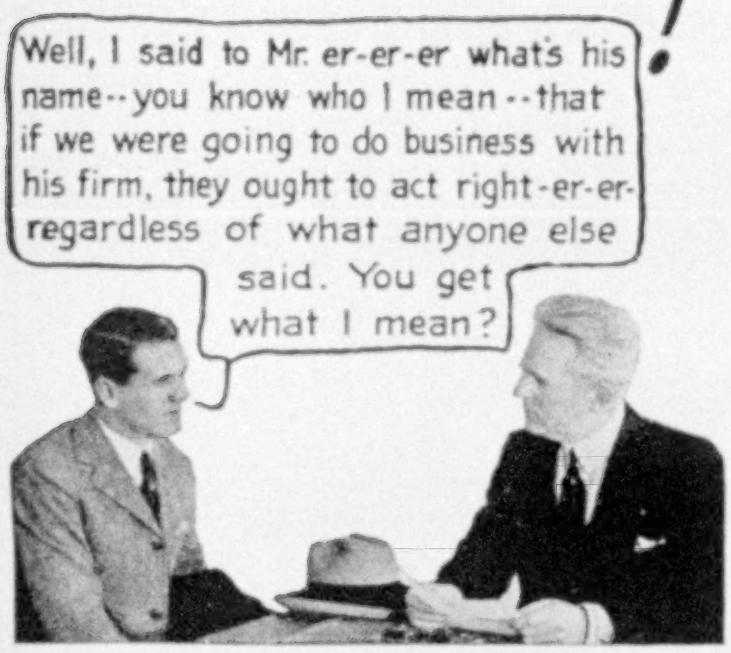
SPECIAL SIX SEDAN
WILLYS-KNIGHT $1495

WHIPPET COACH
$625

Touring, $1295; Roadster, $1350; Coupe, $1295; Coach, $1295; Cabriolet Coupe, $1495. Great Six Sedan, $1995; Touring, $1850; Roadster, $1850; Cabriolet Coupe, $1995; Foursome, $2095; 7-passenger Sedan, $2595; Limousine, $2695. Whippet—Touring, $625; Roadster, $695; Coupe, $625; Sedan, $725; Landau, $755; Cabriolet Coupe, $745. All prices f. o. b. factory and specifications subject to change without notice. Sales Department, Willys-Overland, Inc., Toledo, Ohio. Willys-Overland Sales Co., Ltd., Toronto, Canada.

WILLYS-KNIGHT SIX & WHIPPET

Stop GROPING FOR WORDS!


Well, I said to Mr. er-er-er what's his name--you know who I mean--that if we were going to do business with his firm, they ought to act right-er-er- regardless of what anyone else said. You get what I mean?

IF you hesitate and stammer, and grope for words, if you say "er" or "what-do-you-call it" "or you know what I mean" instead of using exactly the right word to express your meaning—you tell everyone that your mind is asleep. You publish the fact that your education has been sadly neglected. Your limited vocabulary shows clearly that you are dull and uninteresting.

Every time you talk, every time you write, you show what you are. When you use the wrong words, when you mispronounce or misspell a word, when you punctuate incorrectly, when you use flat, ordinary words, you handicap yourself enormously. A striking command of English enables you to present your ideas clearly, forcefully, convincingly. If your language is incorrect it hurts you more than you will ever know, for people are too polite to tell you about your mistakes.

For many years Mr. Cody, one of our greatest authorities on English, studied the problem of creating instinctive habits of using good English. After countless experiments he finally invented a simple method by which you can acquire a better command of the English language in only 15 minutes a day. Mr. Cody's students have secured more improvement in five weeks than previously had been obtained by other pupils in two years.

Send for Free Book on English

To achieve your ambition it is essential that you use good English as instinctively as you tie your shoes. Business today demands men and women who use correct, concise, forceful language. Society demands education, breeding, culture, demonstrated by the use of correct, interesting, and convincing language.

A new book explaining Mr. Cody's remarkable method is ready. This new free book, "How to Speak and Write Masterly English," will prove a revelation to you. Send the coupon or a letter or postal card for it now. Address Sherwin Cody School of English, 381 Searle Building, Rochester, N. Y.

SHERWIN CODY SCHOOL OF ENGLISH
381 Searle Building, Rochester, N. Y.

Please send me your Free Book, "How to Speak and Write Masterly English."

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5½–6% on January Investments

You may obtain safety, diversification, and an attractive interest yield, as high as 5½—6%, on your January investments, by investing in first mortgage bonds through S. W. STRAUS & CO.

We suggest that you write today for our January offerings, and specify

BOOKLET A-1808

S.W. STRAUS & CO.

Investment Bonds Incorporated

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at 46th St.
NEW YORK

STRAUS BUILDING
Michigan Avenue
at Jackson Blvd.
CHICAGO

ESTABLISHED IN 1882

Indian-detour

Santa Fe

Harveycars

A new kind of trip to the Land of "In a Little While"

Three days motoring in luxurious Harveycars through a strange country, on your way to or from California. A courier acting as hostess and guide with each car — a young woman who knows the Indians and the country — its history and fascinating lore.

A vivid, colorful country — high mountains, adobe pueblos, pine and pinyon forests.

And $50 covers all expenses — meals, accommodations with bath, and motor transportation.

Fill out coupon and we will be glad to send complete information.

W. J. Black, Pass. Traf. Mgr., Santa Fe System Lines
1001-A Railway Exchange, Chicago, Ill.

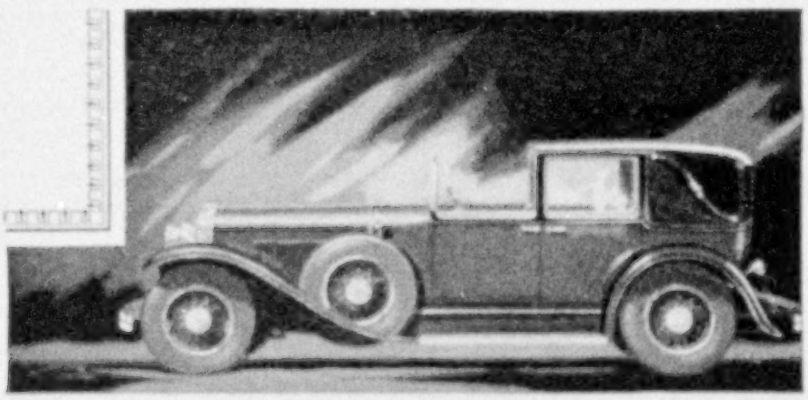
Please send me free picture folder about the Indian-detour and Roads to Yesterday.

THE American motoring public has never, perhaps, beheld a happier or more beneficent combination of names and of organizations than those of Fisher and of Fleetwood. These two famous body builders, joining their artistry and their master craftsmanship, are today creating the finest custom bodies ever presented to the discriminating public of America. The result is plainly evident in the luminous beauty and the princely appointments of the Fisher-Fleetwood custom bodies originated for that brilliant motor car, the La Salle, as well as in the surpassingly distinguished and luxurious Cadillac cars bearing the emblem, Fisher-Fleetwood.

Body by

FISHER-FLEETWOOD

GENERAL MOTORS



FISHER-FLEETWOOD CUSTOM TRANSFORMABLE TOWN CABRIOLET—
ON LA SALLE CHASSIS

Golden State Limited

There are many interesting routes to California, but there is only one Golden State Route. There are many luxurious trains, but only one Golden State Limited.

"Every wish anticipated! And what a variety of things to see—Ranch life, Indians, Mexicans, Missions, Apache Trail, and practically every winter resort in the Southwest!"

Low altitude, warm winter way. 63 hours Chicago to Los Angeles. Shortest and quickest to El Paso, Tucson, Phoenix and San Diego.

Rock Island-Southern Pacific service includes also the *Apache*—same popular low altitude route.

Rock Island Lines

The Road of Unusual Service

309

Rock Island Travel Service Bureau, La Salle Street Station, Chicago, Ill. Please send booklets descriptive of California and the Golden State Route.

Name Address

27

THE ROOSEVELT affords an abode whose gracious hospitality, distinguished cuisine and thoughtful service make it the preferred stopping place of those who wish to be "at home" when travel draws them away from fireside comforts.

1100 Rooms - Single or En Suite

BEN BERNIE
and his Roosevelt Orchestra

Write for a complimentary copy of "Rooseveltiana", containing interesting anecdotes in story and picture, from the life of the great American.

The ROOSEVELT

Madison Avenue at 45th Street
NEW YORK

EDWARD CLINTON FOGG—*Managing Director*

UNITED HOTELS

TUCSON
Land of Blue Sky and Sunshine

Write for free picture book of life and recreation in Arizona's Sunshine City. It tells about outdoor sports, vacation trips, nearby scenery, Old Mexico. Authoritative information about climate, living conditions, costs.

Write "Sunshine Club"—a non-profit organization. Personal service to visitors: meets trains, assists with hotel reservations.

Come Rock Island or Southern Pacific. Winter rates, Stopovers all tickets.

TUCSON
Sunshine Climate Club
ARIZONA

(704) Old Pueblo Bldg., Tucson, Arizona

Please send me the "SUNSHINE BOOKLET"

Name _____

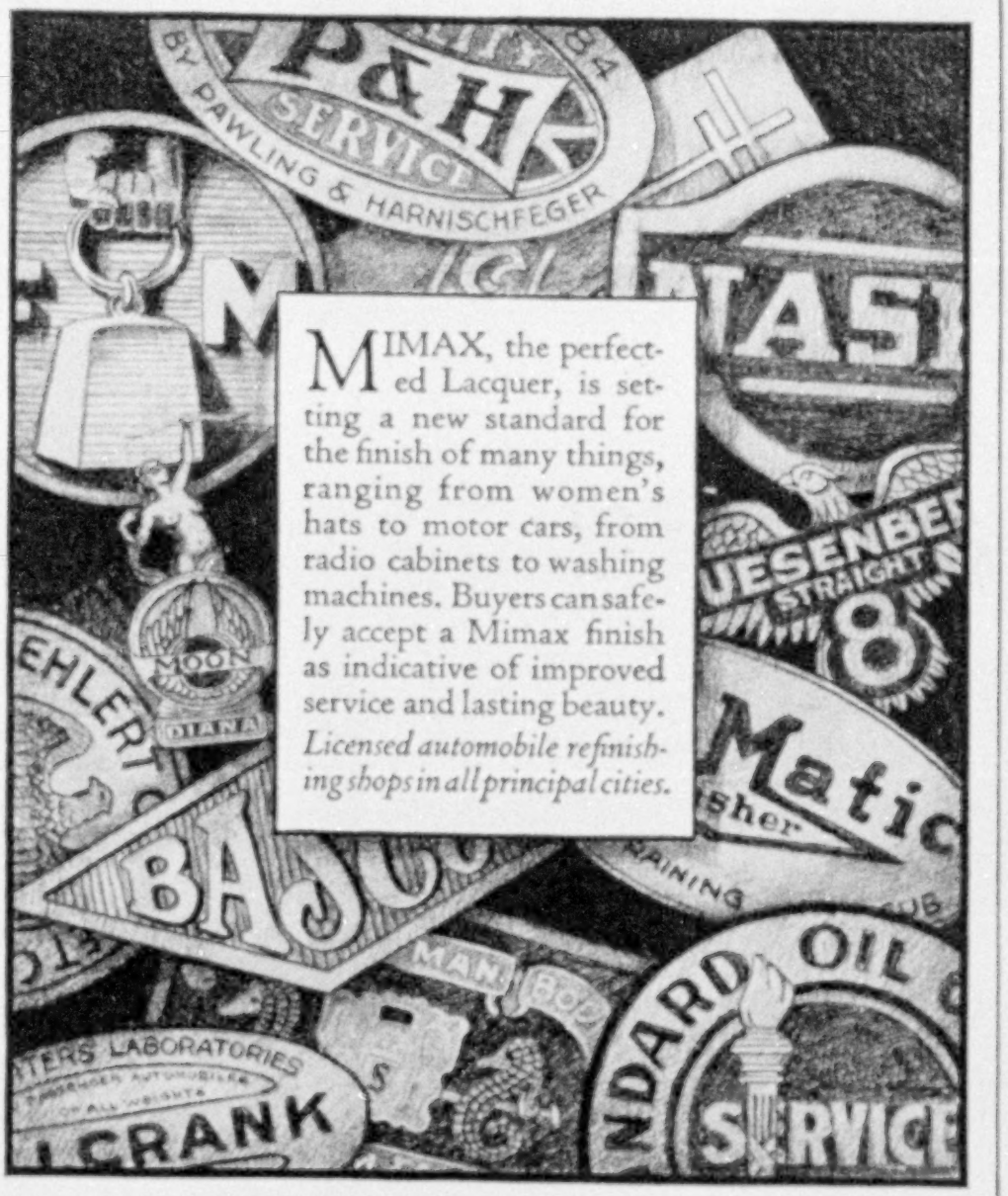
Address _____

CUT COUPON AND MAIL

MIMAX

Lacquer

(My-max)



MIMAX, the perfected Lacquer, is setting a new standard for the finish of many things, ranging from women's hats to motor cars, from radio cabinets to washing machines. Buyers can safely accept a Mimax finish as indicative of improved service and lasting beauty. *Licensed automobile refinishing shops in all principal cities.*

To Manufacturers: Our Paint, Varnish and Lacquer Engineers are at your service, willing to investigate and render impartial recommendations after studying your particular problem. Write for full information—no obligation!

PITTSBURGH PLATE GLASS CO.

Paint, Varnish and Lacquer Factories, Milwaukee, Wis. Newark, N. J., Portland, Ore., Los Angeles, Cal.

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For New Colorful Interiors

Beautiful birch

AMAZINGLY beautiful interiors are now achieved through the wizardry of color upon **birch trim and veneer paneling** in cozy flats and charming homes.

It is now possible to have a different color effect for each room — from light, cool green to deep, mellow brown, from delicate orchid to a rich, rare ebony—all equally attractive.

And, these new transparent stains bring out the full richness of the beautifully figured grain of the wood. Beauty that wins the enthusiastic admiration of your friends and adds to the value of your property.

The close grain and nearly mar-proof hardness of **Michigan-Wisconsin birch** make it one of the most enduring and permanently beautiful finishes. The beauty of **birch floors** is only equalled by their serviceability.

We will gladly furnish full information regarding these new color effects upon birch. There are many valuable suggestions upon interior finishing in our brochure, "Beautiful Birch for Beautiful Woodwork"—Free on request.

THE BIRCH MANUFACTURERS
214 F. R. A. Building
Oshkosh Wisconsin

P. S. Ask your dealer to show you **birch furniture** in these new finishes.

Beautiful Birch for Beautiful Woodwork

SCIENCE cannot give you new sight, but in Emeralite it gives a light that keeps eyes young. Your office needs Emeralite to promote comfort and efficiency. Your home also needs these good looking sight-savers for reading, writing, sewing.

Nature made green and daylight restful to eyes. That's why Emeralite has an Emerald Glass Shade and a screen that changes ordinary electric light into soft, eye-saving daylite.

There is an Emeralite for every purpose. Write for booklet showing complete line.

Genuine Emeralites are branded, have the Emerald Glass Shade with Daylite Screen, and made to give the best service to eyes.

Avoid substitutes.

Sold by department stores, office supply and electrical dealers.

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Est. 1874

EMERALITE
KIND TO EYES

Gladiolus

50 for $1.25 . . . 100 for $2.25
FIFTEEN VARIETIES

ROSES 2-year, Own Root, Field Grown, 75c each; 3 for $2.20; 6 for $4.25; dozen for $8.25. Guaranteed hardy and to bloom from early summer to freeze-up.

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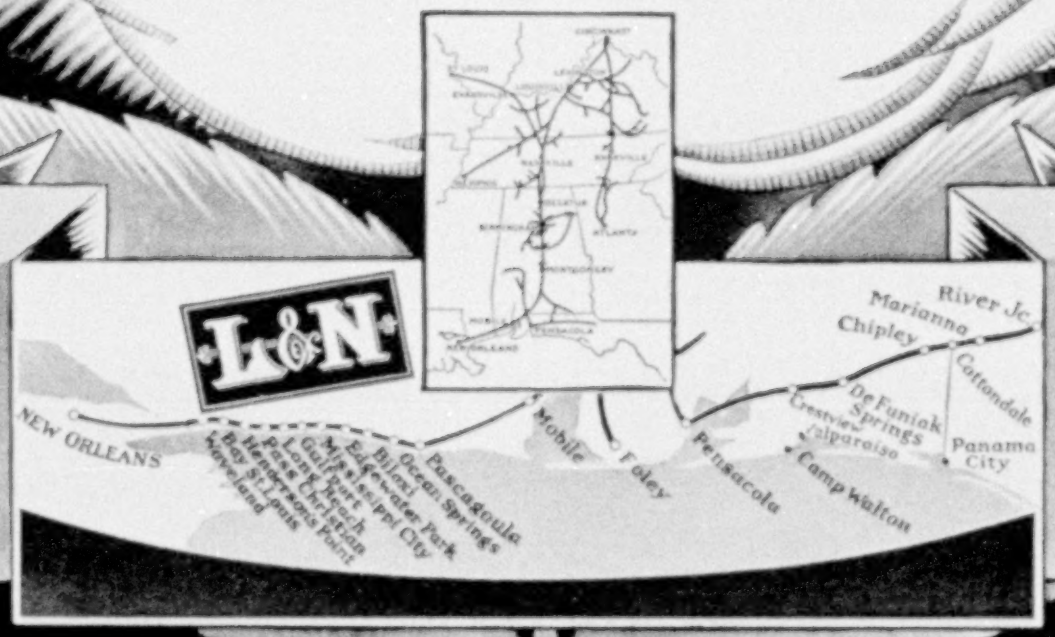
GULF COAST

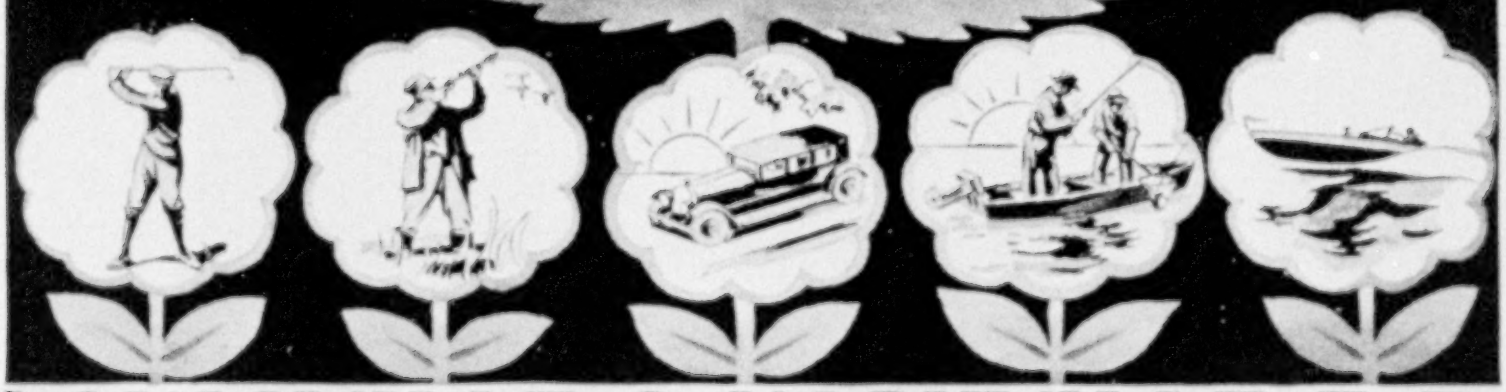
From the gorgeous beauty of the southern rose to the stately splendor of the pine tree and the moss-covered live oak, all nature beckons you to this land of glorious sunshine and outdoor enjoyment, away from the cold and rigorous weather of the North. Every outdoor game you like to play; every sport you have indulged in, is at its finest NOW---golf, hunting, motoring, fishing, sailing, polo, tennis---and finest modern hotels operating at moderate prices. These are the attractions of this American Riviera, easily reached on trains of hotel completeness; from the North and Central West by "The Pan-American" from Cincinnati and Louisville; from New York, Philadelphia, Baltimore, and Washington by the "Crescent Limited"---direct to New Orleans, Mobile, and the Gulf Coast.

These two fine trains are all-steel and all-Pullman with maid and valet service, shower baths, observation and club cars.

Other trains with through Pullman service from the same cities, including a direct sleeper from Boston, and additional through sleeping car service from Chicago.

Write today to R. D. Pusey, G. P. A., L. & N. R. R., Room 303, 9th and Broadway, Louisville, Ky., for complete information about the Gulf Coast as a place to live, a place to visit and a place to prosper.





LOUISVILLE & NASHVILLE R.R.

Hurry!

We Sail Feb-8th

for

Madeira, Gibraltar, Spain, Algiers, Tunis, Malta, Greece, Turkey, Syria, Palestine, Egypt, Sicily, Italy, Monte Carlo, France, England.

Don't Miss this Delightful Mediterranean Cruise-

EVERY day brings the sailing date closer. Mr. James Boring, his expert staff, and their party leave New York City for their third annual Mediterranean Cruise on February 8th. Will **you** be aboard the *S. S. Doric* as she leaves? Have you sent for full particulars of this cruise? Do you know that you can come with us for about what it would cost you to stay at home?

James Boring's Annual Mediterranean Cruise is arranged and personally conducted by a man who knows intimately the countries of the Mediterranean—their peoples, languages, history, customs and geography.

One fee covers ALL expenses afloat and ashore and stop-over steamship tickets—as low as $690, according to location of stateroom. The new White Star Liner *S. S. Doric* has been chartered, special trains, motors and guides meet the ship at all ports.

Mail the Coupon Now for Full Details

Act at once. Reservations are coming in daily. Only 550 persons, about one quarter the capacity of the ship, will be taken on this cruise. Send today for full information.

West Indies Cruises

Sailing Jan. 17th and Feb. 11th, by chartered White Star Liner *S. S. Megantic*, 22 days. All expenses as low as $320.

North Cape Cruise

Sailing June 21, 1928, from Montreal for the "Land of the Midnight Sun" by specially chartered White Star Liner *S. S. Calgaric*, visiting 20 ports. All expenses, from $550 to $1,275, depending upon choice of stateroom.

James Boring's Travel Service, Inc.

45 Astor Place, Dept. M-289 New York, N.Y.
Also 15 West Gay St., Columbus, Ohio

James Boring's Travel Service, Inc., Dept. M-289,
45 Astor Place, New York, N. Y.

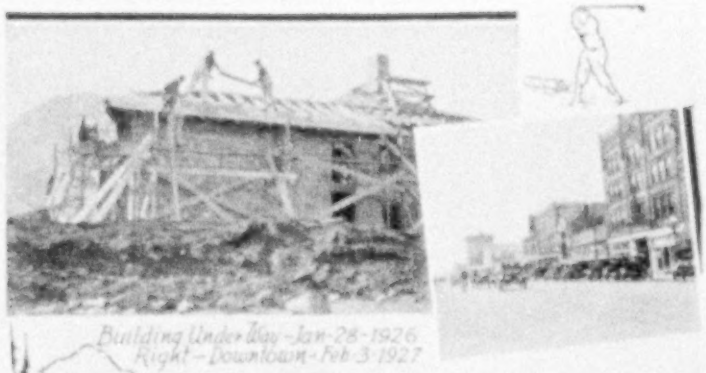
Please send me details of Cruise checked, with deck plan, rates, etc.

- ☐ *Mediterranean* Sailing Feb. 8, 1928
- ☐ *West Indies* Sailing Jan. 17th
- ☐ *North Cape* Sailing June 21, 1928
- ☐ Sailing Feb. 11th

Name .....

Address .....

City ..... State .....



Building Under Way-Jan-28-1926
Right-Downtown-Feb-3-1927

Where Official 58 Becomes 100 in Bright Winter Sunshine!

Seventeen days in January when official thermometer recorded 50 or more; 23 days when it touched 85 or more *in the sun* (13 of them when it reached 100 and more); only two days without any sunshine.

That was January, 1927, in the Pikes Peak Region. Golf played on the first eleven days of the New Year.

Sunshine, rich in ultra-violet rays, and dry air form a combination for outdoor comfort so helpful in building health in the Pikes Peak Region.

It's a combination which gives a new idea of winter to those who use the ten-day stop-over or side trip granted on transcontinental trips. It's the reason why many people with means to live any place are adding to the number of fine homes in this famed scenic spot.

Know more about this Region, accessible the year around—about the City—Homes—"Winning Health"—"100 Winter Days." Any information sent on request to—

THE WELCOME CLUB
131 Independence Building
Colorado Springs, - - - - Colorado

Cathedral Spires Jan 18-1927

Colorado Springs and the Manitou Pikes Peak Region

West Indies

DE LUXE CRUISES

TO PORTO RICO! To Santo Domingo! "Islands of Enchantment" and garden spots of tropical loveliness. Your route passes through superlative beauty, looking into every nook and corner of tourist interest.

11 DAYS ALL EXPENSES **$160 up**

Luxurious S. S. "Cosmo" or "San Lorenzo" your home for entire cruise. Wide range of accommodations and faultless service. Fascinating motor sight-seeing trips included. Stop-overs permitted. *For information address*

PORTO RICO LINE

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ACWI LINES

The lure of the bridle trail, Palos Verdes

Plan Now—

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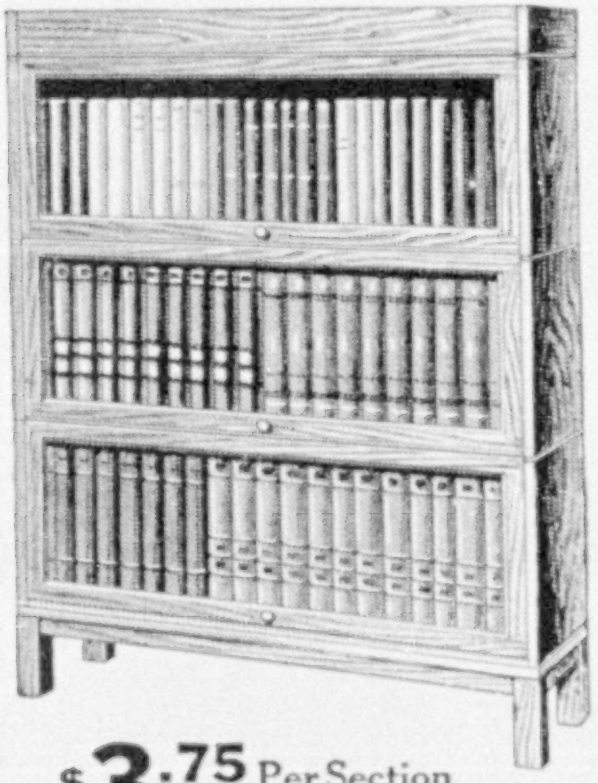

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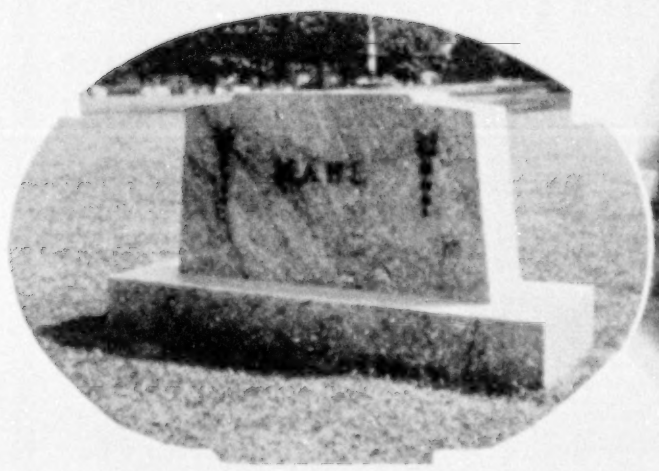

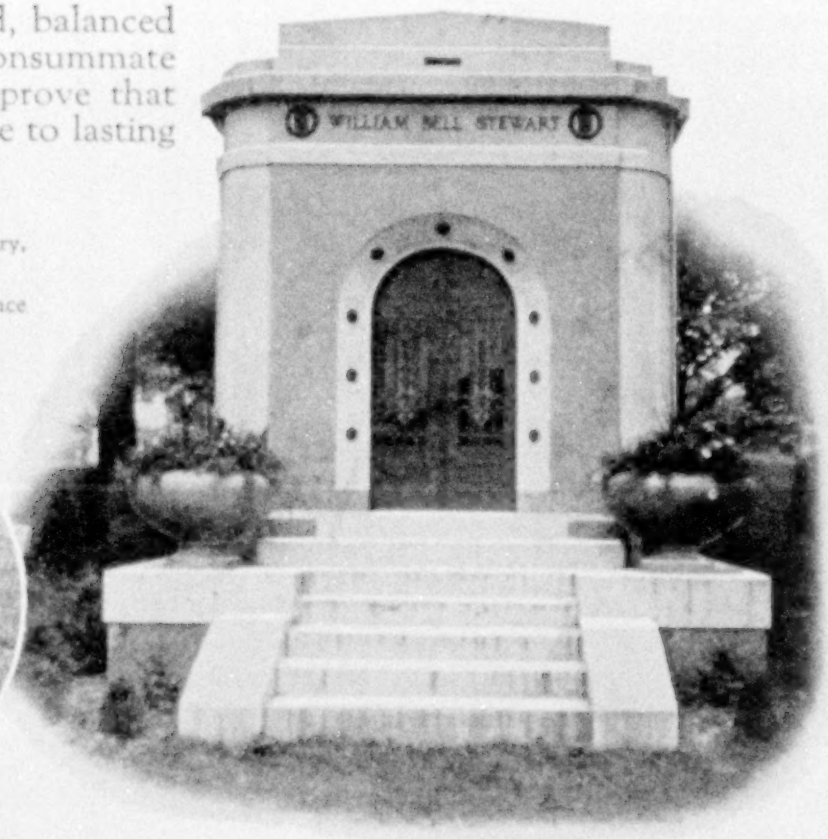

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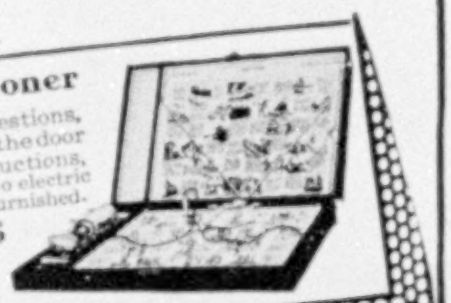

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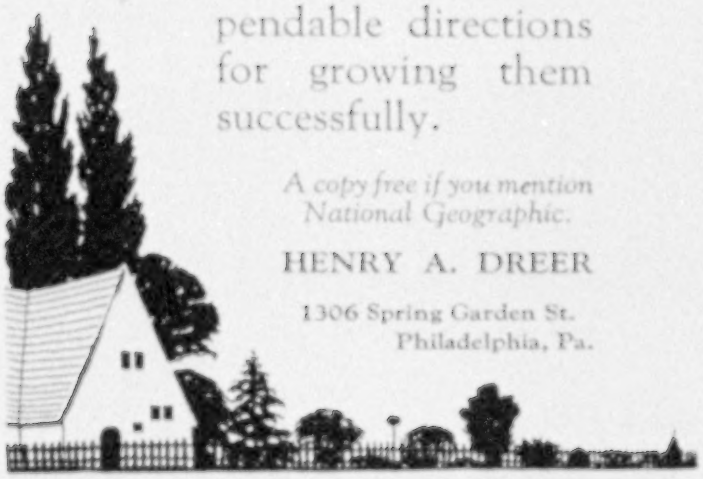

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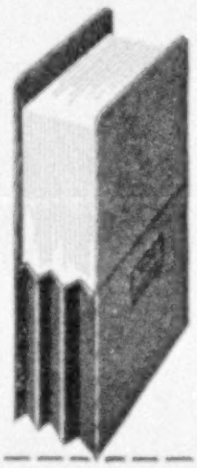

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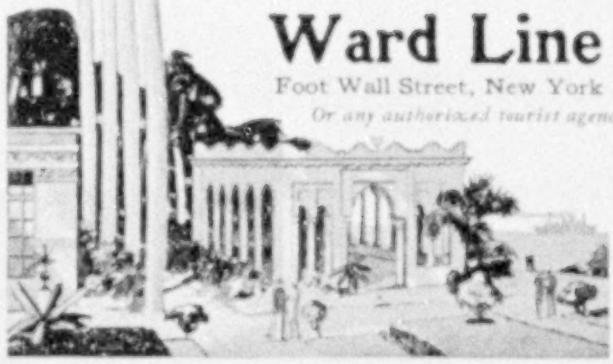

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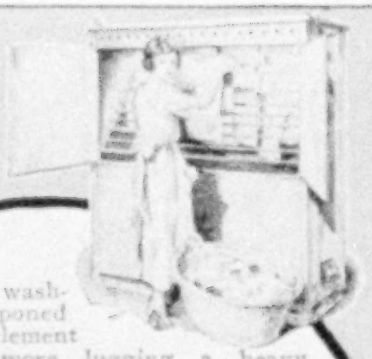

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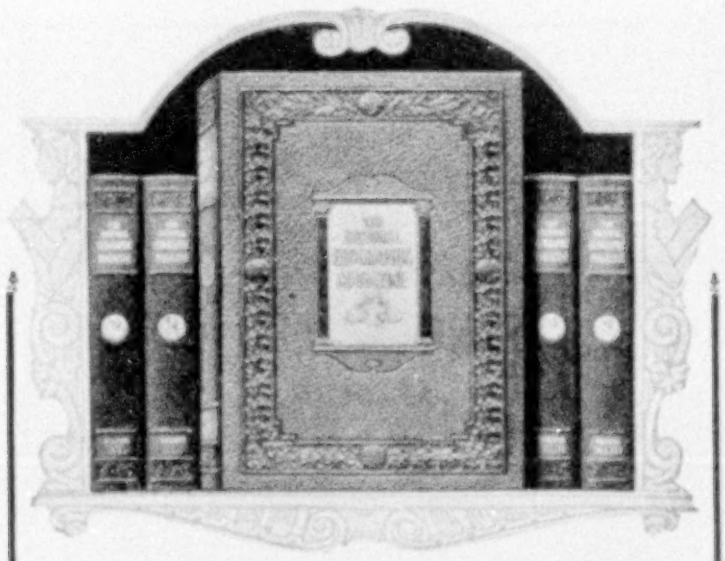

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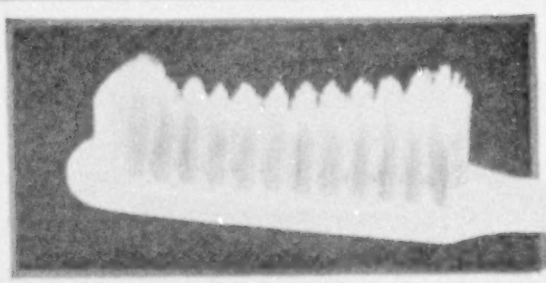

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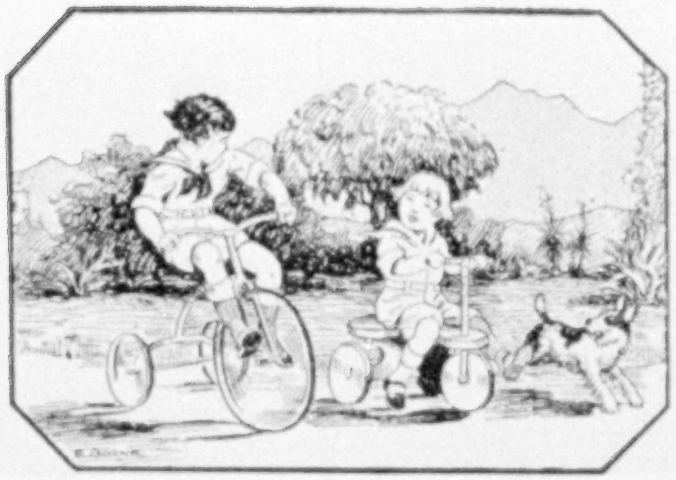

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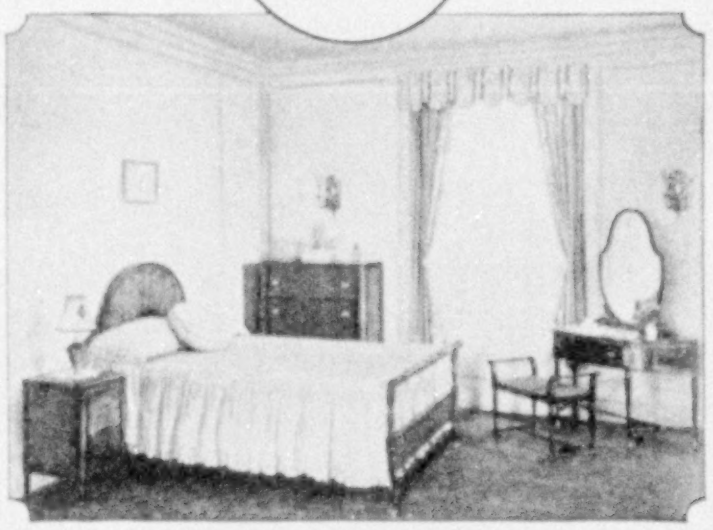

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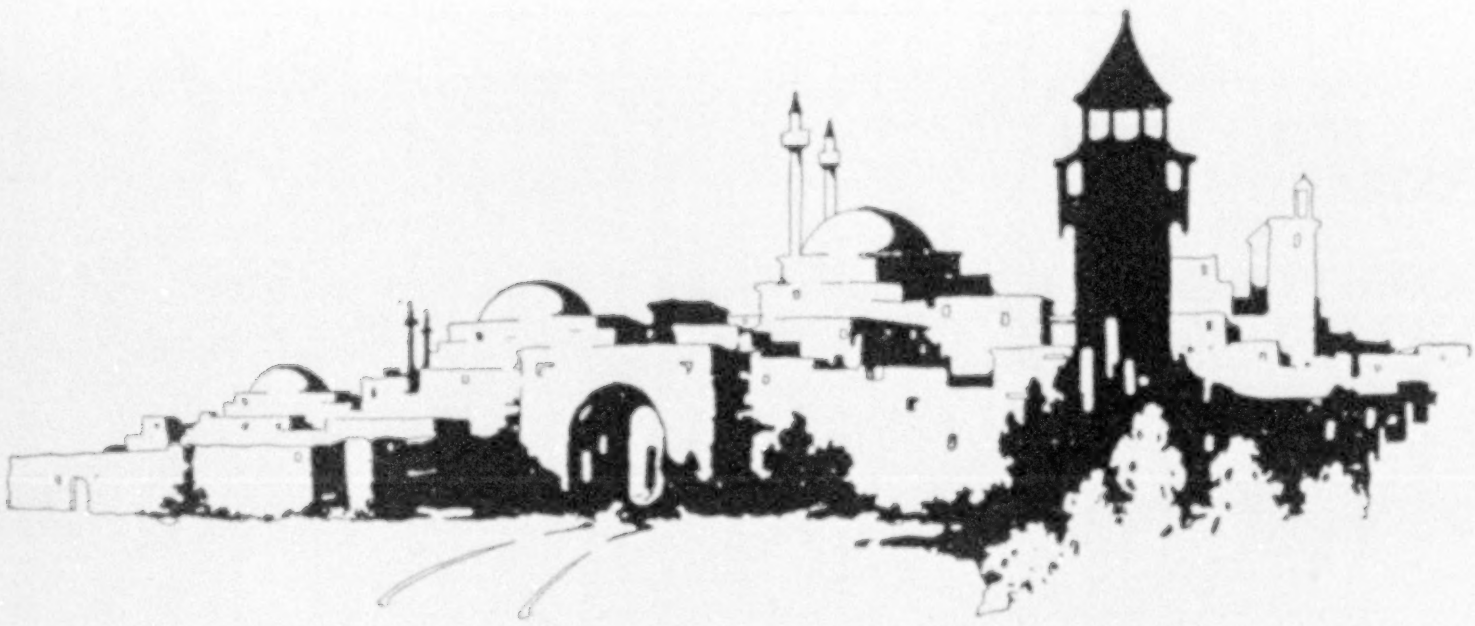

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